IN-02 Fever: what it means, when to treat it and how

HEALING after the FALL, research library, IN-02

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

How to read this document

Fever is the commonest reason a family will open this book, and it is misread in both directions. One family sponges a child with malaria or meningitis and waits for the heat to break while the cause kills. Another gives a two-year-old adult tablets every few hours for three days and destroys the liver. This document tries to stop both errors.

Its central rule: **treat the child, not the number.** Lowering a fever is comfort, not cure. What saves lives is finding the cause and noticing the signs that mean the village cannot cope.

Figures marked [VERIFY] are claims I could not confirm from a source I read, or my own arithmetic. FO-07 covers examination by hand and eye and IN-01 ranks the killers by climate. This document builds on both and does not repeat them.

1. Findings by section

1.1 What fever is, and what it is not

Fever is a raised setting of the brain's thermostat, driven by the response to infection or injury. While the temperature climbs to the new setting the patient shivers and feels cold, and when the setting falls the patient sweats. Heat stroke is different: the thermostat is normal but the body cannot shed heat. Fever drugs act on the thermostat, so they cannot help heat stroke, where only physical cooling works (my inference from the mechanism [VERIFY]).

MSF defines fever as an armpit temperature above 37.5 °C (MSF 2023). Normal adult mouth temperature averages 36.8 °C with an upper limit near 37.7 °C (THRIVING library, FO-07). A fever of 41.1 °C or more is rare: 0.36 per 1,000 visits to an American children's emergency department (Press 1994).

1.2 Fever as a defence: the animal record

What the tradition says. Healers on several continents held that fever "burns out" disease and should be helped, not fought.

What the record shows. Kluger and colleagues infected desert iguanas (Dipsosaurus dorsalis) with Aeromonas hydrophila. Infected lizards chose warmer places, a "behavioural fever" of about 2 °C, and lizards held at 40 or 42 °C survived significantly better than those held at 34 to 38 °C (Kluger, Ringler and Anver 1975). I read only the abstract and could not confirm the survival figure for each group. In the follow-up, 12 infected lizards were given sodium salicylate. The 5 that still developed fever survived the week. The 7 that did not all died within three days (Bernheim and Kluger 1976).

Mammals are less tidy. In rabbits infected with Pasteurella multocida, survival rose with fever up to about 2.25 °C, but higher fevers lowered survival, and rabbits given fever-lowering drugs had lower mortality (Kluger and Vaughn 1978). A review of eight animal studies of influenza found that aspirin, paracetamol and diclofenac raised the odds of death (odds ratio 1.34, 1.04 to 1.73). There were no human trials to pool (Eyers and others 2010).

What modern science infers. Fever is ancient and costly, so it probably earns its keep, and heat speeds immune cells (Evans, Repasky and Fisher 2015). The record supports not fighting moderate fever for its own sake. It does not show that a human fever must never be lowered.

1.3 Fever in sick humans: what the trials show

In 269,078 intensive care patients in Australia and New Zealand, patients with infection whose day-one peak reached 39.0 to 39.4 °C had lower adjusted odds of death than those at 36.5 to 36.9 °C (odds ratio 0.56, 0.48 to 0.66). Without infection the opposite held: 40 °C or more doubled the odds (2.07). A British cohort of 366,973 agreed (Young and others 2012). Patients who cannot mount a fever may simply be sicker, so this is association, not proof.

The HEAT trial gave 700 febrile adults with probable infection 1 g of paracetamol into the vein every 6 hours or placebo. Days alive and out of intensive care were the same (median 23 against 22), death by day 90 was 15.9% against 16.6%, and paracetamol lowered the average temperature by only 0.28 °C (Young and others 2015). A smaller trial of 82 trauma patients compared aggressive treatment (paracetamol above 38.5 °C, cooling blanket above 39.5 °C) with treatment only above 40 °C. It was stopped early with 7 deaths against 1 ($p = 0.06$) (Schulman and others 2005). Small trials stopped early overstate effects.

Two meta-analyses settle the adult question for now: 8 trials with 1,507 septic patients gave a relative risk of death of 0.93 (0.77 to 1.13) (Drewry and others 2017), and 13 trials with 1,963 patients gave 1.03 (0.79 to 1.35) (Sakkat and others 2021). Lowering fever in infected adults neither saves nor kills. I found no trial in children with death as the outcome.

1.4 Fever as a danger

The very young. Fever under 3 months is a red flag because the cause is often dangerous (Section 1.13).

Pregnancy. A meta-analysis of 15 studies found that heat exposure in early pregnancy, from fever, saunas or hot baths, nearly doubled the odds of a neural tube defect (odds ratio 1.92, 1.61 to 2.29) (Moretti and others 2005). A Danish cohort of 8,321 women with first-trimester fever found no rise in overall malformations (read in a search summary [VERIFY]). Paracetamol is the only fever drug MSF allows in pregnancy and breastfeeding (MSF 2023).

Dehydration. Teaching sources add 10% to 12% to daily fluid needs per degree above 37.5 °C, and a German guideline about 10 ml per kg per day per degree, while admitting neither rests on systematic study (German guideline 2005).

Very high fever. Of 105 American children at 41.1 °C or more, 62% had a serious illness, mostly pneumonia (36%), with bacteraemia in 6.7%, meningitis in 5.7%, and 3.8% died (Press 1994). A very high fever is a reason to look harder for a dangerous cause. Brain damage from the heat of an infective fever is said not to occur below about 41.7 to 42 °C (secondary reviews [VERIFY]).

Fear. In 1980, 18% of 81 parents believed a fever below 38.9 °C could damage the brain (Schmitt 1980). Twenty years later 91% of 340 Baltimore carers believed fever itself harmful (Crocetti and others 2001). Fear drives overdosing (Section 1.10).

1.5 Fever therapy before antibiotics

From 1917 Julius Wagner-Jauregg in Vienna infected patients with general paralysis (late syphilis of the brain) with vivax malaria, then cured the malaria with quinine. His clinic reported complete remission in 44% of 141 patients against spontaneous remission of 11.4% (Journal of Mental Science 1925, read in summary). A 1926 pooled review gave full remission in 27.5% and partial in 26.5%, and about 15% of patients treated died (Hektoen International, secondary). He won the Nobel Prize in 1927, and penicillin replaced the method in the 1940s.

This shows a fever can kill a heat-sensitive organism. It is not a reason to let a household fever run. His fever was a controlled infection with the cure in hand, given to people already dying, and it killed about one in seven. Grade B for neurosyphilis then, X for any use now.

1.6 Physical methods

Undressing and fanning. MSF's first instruction is to undress the patient (MSF 2023). The older Where There Is No Doctor says to strip a feverish child, let a breeze reach the skin, never wrap the child, and give plenty of cool water to drink (Werner, older edition, in summary). Grade B by physical reasoning and convergent practice.

Tepid sponging. A Cochrane review found 7 trials with 467 children. With an antipyretic in both arms, adding sponging left more children fever-free at one hour (125 children, risk ratio 11.76, 3.39 to 40.79), but shivering and goose pimples were five times commoner (risk ratio 5.09), and the evidence was weak (Meremikwu and Oyo-Ita 2003). In Bangkok, an hour after paracetamol, 95% of children not sponged were still at 38.5 °C or above against 43% of those sponged, and sponging made children cry (Mahar and others 1994). In America and in Vellore, India, sponging cooled faster in the first hour, made no difference by two hours, and caused more distress (Sharber 1997, Thomas and others 2009). An Australian evidence summary attributes the Bangkok figures to Sharber in error (Bernath, Anderson and Silagy 2002). MSF now tells staff not to wrap children in wet cloths, as it does not work, distresses them and risks chilling (MSF 2023).

Sponging cools the skin while the brain still asks for a higher temperature, so the body shivers and fights back. That is why the gain vanishes by two hours and why cold water is worse than tepid.

Alcohol rubs. Spirits rubbed on children have caused coma and death since reports in the 1950s. One child reached a blood isopropanol level of 380 mg per dl after sponging (1986 report, read as abstract), and a four-year-old in Shenzhen was in intensive care in 2023 (news report). A village with a still will be tempted. Grade X.

Cold baths. In infective fever cold immersion causes shivering and distress. In heat stroke it is the treatment of choice: at the Falmouth road race all 274 runners with exertional heat stroke cooled by immersion survived, cooling at 0.22 °C per minute, and the target is 39 °C within 30 minutes of collapse (BJSM review 2020, in summary).

1.7 Fluids and food

MSF and Where There Is No Doctor agree: give plenty to drink and keep breastfeeding (MSF 2023, Werner). The test is the patient: wet mouth, tears and urine every few hours (THRIVING library, FO-07). "Starve a fever" has no support I could find.

1.8 Willow bark (Salix species)

Plant and part. White willow (Salix alba), purple osier (S. purpurea), crack willow (S. fragilis), violet willow (S. daphnoides). Part used: dried bark of young branches (EMA 2017). Dangerous lookalike: alder buckthorn (Frangula alnus, syn. Rhamnus frangula), whose fresh bark is a violent purgative (EMA frangula summary, in summary), and common buckthorn (Rhamnus cathartica). Poplar (Populus) bark also contains salicin and is easily confused when dried (search summaries [VERIFY]).

What the tradition says. Willow appears in fever lore in Europe, the Middle East and North America. Edward Stone of Chipping Norton tasted the bitterness of white willow bark, guessed it might act like Peruvian bark (cinchona), and gave it for agues for about five years. His letter was read to the Royal Society in 1763. He dried about a pound of bark over a baker's oven for three months, began at 20 grains every four hours between fits, and settled on a dram (about 3.9 g [VERIFY conversion]) every four hours. He reported about fifty patients cured, except some autumnal and quartan agues, where he added one fifth Peruvian bark (Stone 1763).

What the record shows. Stone had no controls, and vivax and quartan malaria remit on their own. He needed cinchona for the hard cases. The EMA accepts willow bark for low back pain on well-established use and for "fever associated with common cold" on traditional use only (EMA 2017).

What modern science infers. Salicin becomes salicylic acid in the body. An extract containing 240 mg salicin gave the salicylic acid exposure of only 87 mg of aspirin (EMA 2017). An adult fever dose of aspirin is 300 to 900 mg. Willow at monograph doses therefore delivers roughly a tenth of an aspirin tablet a day [VERIFY, my arithmetic].

Salicin content. The European and American pharmacopoeias require at least 1.5% total salicylic derivatives (USP monograph, in summary). A Lithuanian study found 0.04% to 12.06% salicin across species, "extremely low" in white willow, and 25% more in two-year-old bark gathered in autumn than one-year-old bark gathered in spring (Kenstavičienė and others 2009). Screening ranks S. daphnoides and S. purpurea highest (Förster and others 2021). An old compendium quoted second-hand gives S. purpurea 6.1% to 8.5% (British Herbal Compendium via an archived post [VERIFY]). So Stone's species is the weakest.

Doses (two sources, which differ). EMA traditional use, adults: tea of 1 to 3 g bark in 150 ml boiling water three times a day, or a decoction of 4 g in 200 ml boiled covered 15 minutes, stood 15 minutes, drunk after meals three times a day, or powder 260 to 500 mg three to eight times a day. Seek help if fever passes 39 °C or lasts more than 3 days (EMA 2017). Commission E asked for 60 to 120 mg salicin a day and ESCOP 2003 for 120 to 240 mg (EMA 2007 comments document). Health Canada caps a single dose at 120 mg salicin (search summary [VERIFY]). At 1.5% salicin, 12 g of bark holds about 180 mg, and boiling extracts an unknown share [VERIFY, my arithmetic].

Who must not take it. Under 18 (Reye's syndrome), third trimester and not advised earlier or in breastfeeding, aspirin allergy or aspirin-induced asthma, active ulcer, bleeding disorders, blood thinners, severe liver or kidney disease, G6PD deficiency (EMA 2017). Melbourne's children's hospital lists willow bark among hidden salicylate sources (RCH Melbourne).

Grade C for adult fever and pain comfort. X as a malaria treatment.

1.9 Aspirin

Dose. Over 16: MSF gives 500 mg to 1 g three to four times a day, maximum 4 g (MSF 2023). A British licence for 300 mg tablets gives 600 to 900 mg every 4 to 6 hours, maximum 3.6 g in 24 hours, and no more than 3 days without advice (Disprin SmPC). **This book uses 3.6 g.**

Children and Reye's syndrome. Reye's syndrome is sudden brain swelling and liver failure after a viral illness, usually influenza or chickenpox. In Arizona during an influenza A outbreak, all 7 children with Reye's syndrome had taken salicylate, against 8 of 16 ill classmates ($p < 0.05$), and severity rose with dose (Starko and others 1980). Ohio and Michigan studies agreed (CDC 1980). After warnings, American cases fell from about 555 in 1980 to no more than 36 a year from 1987, and 31% of 1,207 cases died (Belay and others 1999). The evidence is observational but replicated, and the fall after warnings is hard to explain otherwise.

Dengue and haemorrhagic fevers. Aspirin, ibuprofen and similar drugs are contraindicated because they impair platelets and cause bleeding (MSF dengue, MSF 2023). Where dengue occurs, an undiagnosed fever gets no aspirin.

Overdose. Below 100 mg per kg serious poisoning is unlikely (Disprin SmPC). Below 150 mg per kg symptoms

are minimal, 150 to 300 mg per kg brings ringing ears, vomiting and deep fast breathing, and above 300 mg per kg acidosis, fits and fever. Severe toxicity may take 6 to 12 hours to show, children may not over-breathe, and a teaspoon of oil of wintergreen holds about 7,000 mg salicylate (RCH Melbourne).

Grade A for adults (licensed efficacy, trials not read [VERIFY]). X under 16 and in dengue.

1.10 Paracetamol

Children. From 1 month to 18 years: 15 mg per kg per dose, maximum 1 g, every 4 to 6 hours, maximum 60 mg per kg a day and never above 4 g (bpac NZ 2018). MSF gives the same, three to four times a day (MSF 2023). Hesperian gives 10 to 15 mg per kg every 4 to 6 hours but allows 5 doses a day (Hesperian). Five doses of 15 mg per kg is 75 mg per kg, above the other two sources' ceiling [VERIFY, my arithmetic]. **This book allows 4 doses a day.**

Under 1 month. 10 to 15 mg per kg every 6 to 8 hours, maximum 60 mg per kg a day, for babies born after 32 weeks, less if jaundiced (West of Scotland neonatal monograph). But fever this young is a red flag, not a dosing question.

Malnourished children have less glutathione, the liver's detoxifier, and bpac suggests 10 mg per kg or longer gaps (bpac NZ 2018).

Adults. 1 g three to four times a day, maximum 4 g (MSF 2023). In dengue MSF gives 10 mg per kg every 6 to 8 hours to children and 500 mg every 6 to 8 hours to adults (MSF dengue).

How it poisons. The UK military guideline treats a single dose of 75 mg per kg or more in adults and older children, 150 mg per kg or more in children aged 5 and under, and any staggered overdose above the licensed daily dose (CGO). In the first 24 hours the patient may feel well or only nauseous. From 24 to 72 hours pain appears under the right ribs. From 72 to 96 hours come jaundice, bleeding, confusion and kidney failure (clinical summaries [VERIFY]). Oral acetylcysteine protected almost completely when begun within 8 hours in 2,540 American patients, and starting at 10 to 24 hours, 26% at risk still developed liver damage (Smilkstein and others 1988).

How children are poisoned in practice. Heubi and colleagues collected 47 children given repeated doses "with therapeutic intent": 60 to 420 mg per kg per day for 1 to 42 days, about half on adult preparations, and 24 of 43 died (Heubi and others 1998). In Australia and New Zealand, 14 children suffered liver failure from paracetamol between 2002 and 2012, from doses too large, too frequent or given for up to 24 days (bpac NZ 2018). Even under research supervision, 8% of children in the PITCH trial received too many paracetamol doses in 24 hours (Hay and others 2008). Cold remedies often contain paracetamol, so giving both doubles the dose (Hesperian).

Benefit. In children it lowers temperature and eases discomfort. In septic adults it changes nothing but comfort (Section 1.3). In 50 Gabonese children with malaria it lengthened parasite clearance by about 16 hours (Brandts and others 1997). In 62 adults with severe falciparum malaria 1 g every 6 hours protected the kidneys (Plewes and others 2018), but a trial of 396 patients with knowlesi malaria found no overall benefit (PACKNOW 2022).

Salvaged stock. In the American Shelf Life Extension Program, 88% of 3,005 lots were extended at least a year past expiry, on average by 66 months, but 16% failed and each lot differed (Lyon and others 2006). I found no evidence that old paracetamol turns toxic [VERIFY]. The real danger is unknown strength and hidden paracetamol in combination products.

Grade A for fever and discomfort over 1 month. X when stacked or given as adult tablets to children.

1.11 Ibuprofen (salvaged)

MSF: 3 months to 12 years, 5 to 10 mg per kg three to four times a day, maximum 30 mg per kg a day. From 12 years, 200 to 400 mg three to four times a day, maximum 1,200 mg. Contraindicated in dengue and haemorrhagic fevers (MSF 2023). In PITCH, ibuprofen kept children fever-free longer than paracetamol, adding paracetamol gave no

extra comfort, and 11% of children received too many ibuprofen doses (Hay and others 2008). Grade A. The dose rests on one source read in full.

1.12 Febrile convulsions

What they are. A fit with fever in a child usually aged 6 months to 5 years, without brain infection. They affect 2% to 4% of children and recur in about 30% (Offringa and others 2021). A simple febrile seizure is single and lasts 15 minutes or less. Longer, repeated or one-sided fits are "complex" (StatPearls). Of 639 children followed in Minnesota, 25% had another, more often when the first came young or ran in the family (Annegers and others 1990).

Do fever drugs prevent them? No. Offringa's Cochrane review (32 trials, 4,431 children) found no benefit from paracetamol, ibuprofen or diclofenac. Diazepam during fevers cut recurrence by about a third (risk ratio 0.64), but side effects reached 36%, and up to 16 children must be treated for one to two years to spare one a fit. The authors concluded that families need information, not drugs (Offringa and others 2021). MSF agrees (MSF 2023).

First aid. Note the time. Move hard objects and cushion the head. Do not restrain and put nothing in the mouth. Do not sponge with cold water. When the jerking stops, turn the child onto the side. Seek help if the fit lasts more than 5 minutes, another follows, breathing is a worry, or the child stays drowsy more than an hour (Manchester NHS leaflet).

When it is meningitis. About a quarter of young children with meningitis present with a fit, and an American guideline advises considering a spinal tap at 6 to 12 months when Haemophilus or pneumococcal vaccination is lacking or antibiotics have been given (AAP 2011, in summary). After the Fall vaccination will lapse and this risk will rise.

1.13 Reading the fever

General rule. Fever says there is a fight, not where (THRIVING library, FO-07). MSF lists causes by companion sign: stiff neck or fits (meningitis, severe malaria), belly pain (appendicitis, typhoid), cough (pneumonia, or TB if long), painful urination, red hot skin (abscess), limp (bone or joint infection), ear pain, sore throat, rash (measles, dengue), bleeding (dengue, severe malaria) and joint pain (MSF 2023).

Malaria periodicity. Vivax and ovale give fever every 48 hours (tertian), malariae every 72 hours (quartan), knowlesi every 24 hours. Falciparum, the killer, is often irregular, and mixed broods blur any rhythm (NCBI malaria review). A rhythm is a clue, never proof. In a malarious area every fever is tested, or treated as malaria if no test exists (WHO 2014, THRIVING library, IN-01).

Typhoid's stepladder. Untreated typhoid rises in steps through the first week, plateaus near 39 to 40 °C in the second with rose spots in 5% to 30% and a pulse slower than the fever predicts, and brings bleeding and perforation in the third (1% to 4%). Case fatality was 10% to 20% before antibiotics and below 1% with prompt treatment (GPnotebook). Parry and colleagues' standard review I could not read (Parry and others 2002).

Relapsing fever. Louse-borne relapsing fever gives a first attack of 4 to 10 days ending in a sudden crisis, 5 to 9 days without fever, then up to 5 shorter relapses. A systematic review found untreated mortality of 6% (3.1% without one prison series) and 3.3% with antibiotics, and a violent reaction to treatment (Jarisch-Herxheimer) in 56% (Kahlig, Neumayr and Paris 2021). The MSD Manual's 10% to 40% untreated is an older figure the review contradicts (MSD Manual).

Fever with rash. A rash that does not fade under the side of a clear glass is an emergency. On dark skin look at palms, soles, roof of the mouth and inside the eyelids (NHS). In 448 British children with meningococcal disease, rash, stiff neck and clouded mind came at 13 to 22 hours, while leg pain, cold hands and feet and abnormal skin colour came at about 8 hours in 72% (Thompson and others 2006).

Fever with stiff neck. IMCI calls any fever with stiff neck or a general danger sign "very severe febrile disease": first dose of antimalarial and antibiotic, prevent low blood sugar, refer (WHO 2014). Before antibiotics meningitis killed 95% to 100% of pneumococcal cases, about 90% of Haemophilus cases and 70% to 90% of meningococcal cases (JPMA 2003).

Under 3 months. NICE places babies under 3 months at 38 °C or more in its highest risk group, and 3 to 6 months at 39 °C or more in the next, and treats below 36 °C as equally alarming (NHS). FO-07 uses 37.5 °C and 35.5 °C from the WHO young-infant study (THRIVING library, FO-07). They differ by site and method and both are safe. Serious bacterial infection is found in about 7% to 18% of febrile infants under 3 months (reviews in summary [VERIFY]). MSF admits all febrile infants of 1 to 3 months with no source (MSF 2023).

After childbirth. WHO defines puerperal sepsis from rupture of membranes to day 42 by two or more of: 38.5 °C or more, pelvic pain, foul discharge, and a womb shrinking less than 2 cm a day (WHO definition via GLOWM and ICMR, in summary). Puerperal fever caused 44% of English maternal deaths in 1871 to 1880 (THRIVING library, IN-01).

Long fever. IMCI refers fever present daily for more than 7 days (WHO 2014). Think typhoid, TB, abscess or HIV (MSF 2023).

IMCI doses. The booklet gives one 100 mg paracetamol tablet every 6 hours from 2 months to 3 years (4 to 14 kg) (WHO 2014). That is 25 mg per kg at 4 kg and 7 mg per kg at 14 kg [VERIFY, my arithmetic], which is why this book doses by weight.

Hand and pulse. A hand on the forehead catches about 89% of fevers but raises many false alarms (THRIVING library, FO-07). The pulse rises about 8 to 10 beats a minute per °C (Liebermeister's rule) (LITFL, WMJ 2018). A pulse much faster suggests shock or dehydration. A pulse slower than the fever predicts (Faget's sign) points to typhoid, dengue, leptospirosis, typhus or yellow fever, but is insensitive (LITFL).

1.14 Sweating and cooling traditions

What the traditions say. One tradition sweats out fever under blankets with hot drinks and diaphoretic herbs: elder flower (Sambucus nigra), lime flower (Tilia cordata, T. platyphyllos) and yarrow (Achillea millefolium, flowering top). The other cools, sometimes with spirits or "vodka socks".

What the record shows. No controlled study of sweating cures. ESCOP lists elder flower as a diaphoretic for colds and fever, and the EMA accepts it for early cold symptoms on traditional use only (ESCOP). For lime flower and yarrow I found only tradition.

What science infers. Sweating is how a fever ends when the thermostat falls, not how it is made to fall. Hot tea under a light cover is harmless and the fluid helps. Heavy wrapping traps heat (Werner). Elder's danger is misidentification with poison hemlock (Conium maculatum), which has hollow, smooth, purple-blotched stems and a musty smell (Michigan State extension), and water hemlock (Cicuta). Elder is a woody shrub with 5 to 7 toothed leaflets (Woodland Trust). Dwarf elder (Sambucus ebulus) is non-woody, flowers later and is toxic (Irish Wildflowers). Use only the flowers.

2. Evidence grades

Practice	Tradition	Record	Inference	Grade
Letting moderate fever run	Fever burns out disease	Lowering fever does not change adult sepsis mortality	Defence, rarely worth fighting	A (either choice safe in adults)

Practice	Tradition	Record	Inference	Grade
Paracetamol 15 mg/kg for distress	Modern pharmacy	Lowers fever and discomfort	Comfort drug, narrow margin	A
Fever drugs to prevent fits	Common belief	No benefit in 32 trials	Fits not prevented	X
Ibuprofen 5 to 10 mg/kg	Modern pharmacy	Longer fever-free time (PITCH)	Avoid in dengue	A
Aspirin	Modern pharmacy	Effective in adults, Reye's in children	Adults only	A adults, X children and dengue
Willow bark	European and American lore	Stone uncontrolled, back pain only	A tenth of an aspirin a day	C adults, X for malaria
Undress, fan, fluids	WTND, MSF	No trial, consistent practice	Lets heat leave	B
Tepid sponging	Widespread	Faster at 1 hour, same at 2, more distress	Fights the thermostat	B brief comfort, D as treatment
Cold baths for infective fever	Some households	Shivering, distress	Raises heat production	X
Cold immersion for heat stroke	Sports medicine	274 of 274 survived	Heat must be removed	B
Alcohol rubs, wrapping to sweat	Folk practice	Comas and deaths, trapped heat	Poison, heat trap	X
Diaphoretic teas	Sweating cure	No trials	Harmless fluid if well identified	D
Induced malaria fever	Wagner-Jauregg	27% to 44% remission, about 15% died	Obsolete	B then, X now
Malaria periodicity	Classical medicine	Falciparum often irregular	Clue only	D
IMCI fever algorithm	WHO	Used by lay workers	Best lay triage (FO-07)	A/B

3. Means ledger

Practice	Hands and knowledge	Hearth	Garden and still	Village dispensary (300)	District infirmary (3,000)	Hospital before the Fall
Assessment	Danger signs, breaths, pulse, neck, glass test	Clock, glass	Scale, fever chart	Thermometer, malaria test, IMCI chart	Blood film, urine test	Cultures, spinal tap, imaging
Comfort cooling	Undress, shade, fan	Tepid water, cloth	Same	Same	Same	Same
Fluids	Breastfeeding, drinking	Boiled water, salt and sugar solution	Measured cups	Oral rehydration salts	Drips, tube feeding	Monitored IV fluids

Practice	Hands and knowledge	Hearth	Garden and still	Village dispensary (300)	District infirmary (3,000)	Hospital before the Fall
Willow bark	Identify trees	Decoction	Coppice of S. purpurea, dried and weighed	Standard bark, adults only	Rarely needed	Not used
Aspirin, paracetamol, ibuprofen	None	Salvaged tablets, dose by weight	Scale, tablet knife, dose diary	Logged stock by strength	Acetylcysteine for overdose	Blood levels, liver unit
Febrile fit	Time it, side position	Same	Same	Recognise meningitis, first antibiotic	Spinal tap, injectable antibiotics, diazepam	Intensive care
Heat stroke	Shade, strip, wet and fan	Tub of water	Same	Thermometer	Same	Intensive care

Hands and knowledge change the most: spotting the child who needs more than cooling, and avoiding harm. The hearth adds rehydration and, with a scale, correct doses. The garden adds willow, which is weak. The dispensary and infirmary change outcomes by treating causes (malaria tests, antimalarials, antibiotics) and rescuing overdose, not by controlling fever.

4. Harm test

Undressing. Chills newborns and the malnourished. Warning signs: cold hands and feet, shivering, below 36 °C. Then cover lightly.

Sponging. Shivering and distress (Meremikwu and Oyo-Ita 2003). Errors: cold water, ice, wet wraps left on, alcohol. Then stop, dry, cover lightly.

Alcohol rubs. Poisons through skin and breath. Never.

Cold immersion. Harmful in infective fever, lifesaving in heat stroke. The error is confusing the two.

Willow bark. As aspirin, in smaller dose: Reye's under 18, bleeding with blood thinners, asthma in the aspirin-sensitive, stomach ulcer (EMA 2017). Fresh Frangula bark purges violently. The worst error is relying on it for malaria. Signs: vomiting, ringing ears, black stools, wheeze. Then stop.

Aspirin. Reye's syndrome in children (31% died, Belay and others 1999), bleeding in dengue, stomach bleeding, poisoning above 150 mg per kg (RCH Melbourne). Never under 16, in late pregnancy or breastfeeding, with ulcer or bleeding, or for undiagnosed fever where dengue occurs. In a child who vomits and grows drowsy after flu or chickenpox, think of Reye's.

Paracetamol. Liver failure, silent for a day. Errors: adult tablets for children, combination products on top of plain paracetamol, more than 4 doses a day, several carers each giving a dose, kitchen spoons, more than 3 days without review (bpac NZ 2018, Heubi and others 1998). Harmful doses: 150 mg per kg at once under 6, 75 mg per kg in older children and adults (CGO), or repeated days above 60 mg per kg. Most at risk: acutely ill under-5s and malnourished children. Signs: vomiting, apparent recovery, right upper belly pain, then yellow eyes, bleeding, confusion. Then stop, give acetylcysteine if held, keep the patient drinking.

Ibuprofen. Bleeding in dengue, stomach ulcer, kidney injury in the dehydrated child [VERIFY]. Never under 3 months.

Diaphoretic teas. Hemlock misidentification, heavy wrapping.

Historical harm. Reye's syndrome, peaking at about 555 American cases in 1980 (Belay and others 1999). Paracetamol liver failure in 47 children dosed "therapeutically" (Heubi and others 1998). Alcohol-sponging comas from the 1950s to 2023. Fever therapy deaths, about 15% (Hektoen International).

5. Red flags

Each means: give whatever first treatment the village holds, send for the most skilled help that exists, keep the patient comfortable.

1. **Any IMCI danger sign:** cannot drink or breastfeed, vomits everything, has fitted, lethargic or unconscious, fitting now (WHO 2014). Give first antimalarial and antibiotic doses if held, sugar water or breast milk, carry to help.
2. **Stiff neck, bulging soft spot, or a fit that is long, one-sided, repeated or followed by failure to wake within an hour.** Treat as meningitis.
3. **Non-fading rash,** or cold hands and feet, leg pain and mottled skin in a child getting rapidly worse (NHS, Thompson and others 2006).
4. **Any fever under 3 months,** or below 36 °C (NHS).
5. **Fever within 42 days of birth or miscarriage** with foul discharge, belly pain or fast pulse.
6. **Fever with bleeding,** or a fever that falls on day 3 to 7 followed by belly pain, vomiting, restlessness or cold skin. In dengue this is the dangerous phase (MSF dengue).
7. **Fast or difficult breathing, chest indrawing, grunting** (FO-07, IN-01).
8. **Pulse much faster than the fever explains, cold hands, little urine, confusion.** Shock.
9. **Above 41 °C,** or hot skin and confusion after heat exposure. Cool hard and fast.
10. **Daily fever for more than 7 days** (WHO 2014).
11. **In a malarious area, deep breathing, great pallor, dark urine, yellow eyes or drowsiness.** Severe malaria.

Honest comfort. When the cause cannot be treated, paracetamol at the right dose, a cool room, sips of water, a damp cloth if it soothes and a parent's presence are real care. A dying child is not helped by repeated sponging, and the family must not be made to feel that failing to lower a number killed their child.

6. The case against

Against the romance of fever. The "fever is good" record rests on lizards, rabbits and mice, and Kluger's own rabbit study found very high fevers harmful and fever drugs protective (Kluger and Vaughn 1978). In humans the trials are null (Drewry and others 2017, Sakkat and others 2021). Heat harms in early pregnancy (Moretti and others 2005). Fever therapy killed about one in seven. Mackowiak asked whether fever is "blessing or curse" (Mackowiak 1994, title only). It is mostly neither, and the cause matters far more.

Against the romance of the herbal. Willow at monograph doses gives about a tenth of an aspirin a day. Stone's cures were uncontrolled in a disease that remits, and he needed cinchona. White willow is the weakest species. The diaphoretic teas have no trials. The EMA accepts them only on traditional use, which by definition is not evidence of effect (EMA 2017).

Against the romance of the hospital. HEAT gave intravenous paracetamol to 345 patients in modern intensive care and changed only a quarter of a degree (Young and others 2015). Paracetamol killed more than half of Heubi's 47 children. Aspirin caused Reye's syndrome for two decades before Starko's team noticed (Starko and others 1980).

Against this report's own rule. "Treat the child, not the number" assumes someone who can tell a distressed child from a dying one, and IMCI signs miss some serious illness (THRIVING library, FO-07). The infant thresholds come from vaccinated, well-fed populations. After the Fall, with no vaccines, more hunger and more malaria, a larger share of fevers will have a dangerous cause, so the rules should be more cautious. Critics of overtreatment such as Schmitt, Crocetti and Offringa wrote for societies with doctors on call.

7. 10-line summary

1. Fever is a symptom. Lowering it is comfort, not cure, and does not change survival in septic adults (1,963 patients, 13 trials).
2. Fever drugs do not prevent febrile fits, which are frightening but almost always harmless.
3. Treat fever with drugs only for distress, and never let it delay finding the cause.
4. Paracetamol 15 mg per kg every 4 to 6 hours, no more than 4 doses or 60 mg per kg a day. Adults 1 g, maximum 4 g.
5. Paracetamol overdose is silent for a day, and 150 mg per kg at once in a young child, or days over the limit, can destroy the liver.
6. Aspirin only over 16, never in dengue, 300 to 900 mg every 4 to 6 hours, maximum 3.6 g a day.
7. Willow bark is a weak salicylate, forbidden under 18, and no cure for malaria.
8. Undress, fan and give fluids. Sponging helps for an hour. Cold water and alcohol harm.
9. Fever under 3 months, after childbirth, with stiff neck, non-fading rash, danger signs or bleeding needs more than the household has.
10. Patterns hint at cause, but only a test proves malaria, and in a malarious place every fever is malaria until shown otherwise.

8. Open questions

- Does lowering fever change survival in children with malaria, pneumonia or sepsis? No trial found.
- Is paracetamol harmful in malaria (slower clearance) or protective (kidneys)? The trials disagree.
- How much salicin does a village decoction of a known willow deliver?
- What is untreated mortality of typhoid and relapsing fever in a hungry population?
- At what temperature, if any, does infective fever itself harm the brain?
- How should infant thresholds adapt when temperature is judged by touch?
- Does 10 mg per kg paracetamol still work in malnourished children?

9. Sources to read in full

1. Offringa and others (2021), Cochrane CD003031, febrile seizures.
2. Young and others (2015), HEAT, New England Journal of Medicine.
3. Meremikwu and Oyo-Ita (2003), Cochrane CD004264, physical cooling.
4. WHO (2014), IMCI Chart Booklet.
5. MSF (2023), Clinical guidelines, Fever and Dengue.
6. Heubi, Barbacci and Zimmerman (1998), Journal of Pediatrics.
7. EMA HMPC (2017), Salix cortex monograph and assessment report.
8. Kluger (1979), Fever: Its Biology, Evolution and Function, Princeton University Press (named in the brief, not read).
9. Parry and others (2002), Typhoid fever, New England Journal of Medicine (not read).
10. Kahlig, Neumayr and Paris (2021), louse-borne relapsing fever review.

At the bedside after the Fall

Household. A written fever chart, a known weight for every child, the danger-sign list on the wall, a clock, a glass for the rash test and a locked medicine box. Skills: counting breaths and pulse for a full minute, checking the neck, the glass test, fit first aid and the dose rule. To start: a scale (a steelyard or beam with known weights), a cup marked in millilitres, a knife to quarter tablets, a notebook. First failure to expect: two carers each giving a dose, or adult tablets given to a child. Second: sponging a drowsy child and waiting.

Village of 300. One healer trained in IMCI, a thermometer, a scale, malaria tests or a microscope where malaria occurs, salvaged paracetamol and ibuprofen logged by strength, first-dose antimalarials and antibiotics, oral rehydration salts, and a register of every fever with weight, dose and outcome. A coppice of S. purpurea or S. daphnoides for adult pain. One keeper of the medicine store, and no child's medicine leaves without a written dose. First failure to expect: "cold and flu" combination tablets mixed into the plain paracetamol.

District of 3,000. Injectable antibiotics and antimalarials, blood films, a spinal tap if someone is trained, acetylcysteine and diazepam. Written protocols for febrile infants, puerperal fever and suspected meningitis. Training days for village healers, a cause-of-death register, and carts or runners to bring children in. First failure to expect: a village sends a child too late because cooling seemed to work.

Protocols

Protocol 1. Is this fever dangerous? (every fever, every age)

1. Can the patient drink? Vomits everything? Has fitted? Drowsy, floppy, hard to wake? Any yes: step 9.
2. Under 3 months: step 9.
3. Given birth or miscarried in the last 6 weeks: step 9.
4. Chin to chest freely? Soft spot bulging? Abnormal: step 9.
5. Any rash: press a clear glass on it. Not fading, or dark spots on palms, soles, eyelids or roof of mouth: step 9.
6. Count breaths for a full minute. 60 or more under 2 months, 50 or more at 2 to 11 months, 40 or more at 1 to 5 years, or chest indrawing: pneumonia (FO-07, IN-01).
7. Count the pulse for a minute and feel hands and feet. Fast pulse with cold hands or little urine: shock, step 9.
8. Daily fever more than 7 days: send to the district. Malarious area: test or treat for malaria today. Dengue area: no aspirin or ibuprofen.
9. Danger: first doses of antimalarial and antibiotic if held and trained, sugar water or breast milk if able to swallow, keep a baby warm and an older child cool, carry to help, note the time.
10. No danger: Protocol 2, and look again every 4 to 6 hours. Return at once if a danger sign appears.

Protocol 2. Comfort care

1. Remove extra clothes and blankets. A baby under 2 months keeps one light layer. Never wrap to sweat.
2. Shade, open window, gentle fanning.
3. Fluids often: breast milk, boiled water, oral rehydration solution if diarrhoea.
4. Food if wanted.
5. If distressed, paracetamol by weight (Protocol 3). Not to chase the number.
6. Sponging, if used: water neither warm nor cool to the elbow, 10 to 15 minutes, only after a drug, stop at the first shiver. Never cold water, ice or alcohol. Never leave wet cloths on.
7. Check and write temperature or touch, pulse and breaths at least 4 times a day.
8. After 3 days of fever stop the drugs and look again for the cause (MSF 2023).

Protocol 3. Paracetamol by weight

Rule: **15 mg per kg per dose, every 4 to 6 hours, at most 4 doses and 60 mg per kg in 24 hours, never above 1 g a dose or 4 g a day** (bpac NZ 2018, MSF 2023). Weigh the child. Bands are my arithmetic, keeping each dose near 10 to 15 mg per kg [VERIFY].

Weight	Dose	500 mg tablet	Syrup 120 mg in 5 ml	Most in 24 hours
Under 1 month	Not at home. Healer only, 10 to 15 mg/kg every 6 to 8 hours	No	Healer measures	60 mg/kg
4 to under 6 kg	60 mg	No	2.5 ml	240 mg
6 to under 8 kg	90 mg	No	3.75 ml	360 mg
8 to under 12 kg	120 to 125 mg	One quarter	5 ml	480 mg
12 to under 17 kg	180 mg	Syrup better (a quarter is a low dose)	7.5 ml	720 mg
17 to under 25 kg	250 mg	One half	10 ml	1,000 mg
25 to under 34 kg	375 mg	Three quarters	No	1,500 mg
34 to under 50 kg	500 mg	One	No	2,000 mg
50 to under 67 kg	750 mg	One and a half	No	3,000 mg
67 kg and over	1,000 mg	Two	No	4,000 mg

Tolerance: within 10% of the dose. Never round up for a sick, small or hungry child. Malnourished: 10 mg per kg or 3 doses a day (bpac NZ 2018). Dengue: 10 mg per kg every 6 to 8 hours (MSF dengue). Check every salvaged packet: anything marked “cold”, “flu”, “plus” or listing more than one drug counts toward the paracetamol total if it contains it. One person gives doses and writes each in the diary.

Protocol 4. Aspirin (16 and over only)

1. Confirm: 16 or over, not in late pregnancy or breastfeeding, no ulcer, bleeding or aspirin asthma, not undiagnosed fever in a dengue area.
2. 300 to 900 mg with food every 4 to 6 hours.
3. At most 3.6 g in 24 hours, at most 3 days without review (Disprin SmPC).
4. Stop for ringing ears, vomiting, deep fast breathing, black stools, bleeding gums or wheeze.

Protocol 5. Willow decoction (18 and over only)

1. Identify the tree in leaf and catkin. Prefer S. purpurea or S. daphnoides. Reject any shrub bearing black berries, the mark of buckthorn [VERIFY field sign].
2. Strip bark from young branches in spring or autumn, dry in shade until it snaps, store labelled.
3. Weigh 4 g. Boil covered in 200 ml water for 15 minutes, stand 15 minutes, strain (EMA 2017).
4. Drink warm after food, three times a day, for no more than 3 days of fever without looking again for the cause.
5. Exclusions as aspirin, plus under 18 and blood thinners. Never with aspirin. Expect a mild effect and no malaria cure.

Protocol 6. Ibuprofen (from 3 months)

1. Not under 3 months, not in dengue or bleeding fevers, not in a dry child passing no urine [VERIFY], not with stomach pain.
2. 3 months to 12 years: 5 to 10 mg per kg three to four times a day, at most 30 mg per kg a day. From 12 years: 200 to 400 mg, at most 1,200 mg a day (MSF 2023).
3. With food. Do not routinely combine with paracetamol (Hay and others 2008). Switch rather than stack, and record both.

Protocol 7. A febrile fit

1. Note the time.
2. Soft surface, hard objects away, head cushioned.
3. No restraint, nothing in the mouth, no drink, no cold sponging or bath.
4. When jerking stops, turn onto the side and loosen clothing.
5. Past 5 minutes, a second fit before waking, or breathing stops: send for the most skilled help. Diazepam only by a trained person.
6. Afterwards check neck, soft spot, rash and one-sided weakness. Any abnormal, not alert within 1 hour, or under 12 months and unvaccinated: treat as meningitis (Protocol 1, step 9).
7. If well within the hour: comfort care, find the cause, and tell the parents that one child in three fits again with a later fever, that the brain is not damaged, and that fever drugs will not prevent it (Offringa and others 2021).

Protocol 8. Suspected paracetamol overdose

1. Add every dose in the last 24 hours, including combination products, in mg, and divide by weight in kg.
2. Over 150 mg per kg at once aged 5 or under, over 75 mg per kg at once in anyone older, or more than the daily maximum: treat as poisoning. If unsure, treat (CGO).
3. Stop all paracetamol.
4. Acetylcysteine if held, as soon as possible, best within 8 hours, still worth starting up to 24. The studied oral course was 140 mg per kg, then 70 mg per kg every 4 hours for 17 doses (Smilkstein and others 1988).
5. Keep the patient drinking and watch for 4 days. Well on day one means nothing. Yellow eyes, bleeding, confusion or no urine on days 2 to 4 means liver failure, beyond the village. Give comfort.
6. Record what happened and change the system that allowed it.

Protocol 9. Heat stroke

1. Collapse or confusion after heat or hard work in heat, with hot skin.
2. Shade, strip, immerse to the neck in the coolest water available, or soak and fan hard.
3. Cool to 39 °C within 30 minutes, then stop to avoid overshoot (BJSM review 2020).
4. No paracetamol, aspirin or willow.
5. When awake, sips of cool salted fluid.

Protocol 10. The fever chart

For every fever record name, age, weight, onset, each temperature or touch reading with time, pulse, breaths, danger signs checked, each drug with mg, mg per kg, time and giver, fluids in and urine out, and outcome. A pattern (every 48 hours, a stepwise rise, a week off then return) is worth showing to the district healer.

Numbers to carry

1. **15 and 60.** Paracetamol 15 mg per kg a dose, 60 mg per kg and 4 doses a day at most (bpac NZ 2018, MSF 2023).
2. **150.** mg per kg of paracetamol at once that can wreck a young child's liver, silently for a day (CGO).
3. **8 hours.** The window in which acetylcysteine almost always prevents liver damage (Smilkstein and others 1988).
4. **16 and 18.** No aspirin under 16, no willow under 18 (Disprin SmPC, EMA 2017).
5. **3.6 g.** Adult aspirin maximum a day (Disprin SmPC). MSF allows 4 g.
6. **3 months, 38 °C, 36 °C.** Any fever under 3 months, or a temperature below 36 °C, is a red flag (NHS).
7. **5 minutes.** A fit longer than this needs help. One in three fits again, and fever drugs do not prevent it (Offringa and others 2021).
8. **3 and 7 days.** Review any fever treated 3 days, refer daily fever beyond 7 (MSF 2023, WHO 2014).
9. **38.5 °C and 42 days.** Puerperal sepsis temperature and window (WHO definition).
10. **8 to 10 per degree.** Pulse rise per °C. Much faster suggests shock, much slower typhoid or dengue (LITFL).

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