IN-11 Cholera, typhoid and dysentery: outbreak control and case management

HEALING after the FALL, research library, IN-11

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

How to read this report

Cholera, typhoid and the dysenteries travel one road: faeces, then water, food or hands, then the mouth. They kill on different clocks. Cholera kills by fluid loss, sometimes within hours. Typhoid kills in its second to fourth week, by a hole in the bowel, by bleeding or by toxaemia. Shigella kills small children and the malnourished through toxaemia, seizures, kidney failure and wasting. Amoebic dysentery is slower.

This report builds on three library documents and does not repeat them. The household rehydration recipe, the WHO plans and the hypernatraemia record are in HY-03 (THRIVING library, HY-03). Chlorination by bleach drops is in HY-02 (THRIVING library, HY-02). Latrines and the siting of a cholera centre are in HY-04 (THRIVING library, HY-04). IN-13, NU-02 and NU-07, named in the brief, did not yet exist.

Findings by section

1. Cholera

1.1 The disease in numbers WHO's fact sheet gives an incubation period of 12 hours to 5 days. Severe cases can die within hours. A treatment centre should keep case fatality below 1%. WHO estimates 1.3 to 4.0 million cases and 21,000 to 143,000 deaths a year, and counted 451,499 reported cases and 7,870 deaths in 2025 (WHO 2026). About 80% of symptomatic cases are mild or moderate and 20% severe. People without symptoms shed the organism for 1 to 10 days (GTFCC 2022). Severe cases can lose 500 to 1,000 mL of stool an hour (MSF cholera guideline, search summary). A 50 kg adult with severe dehydration has a deficit of about 5 litres, and in the first 24 hours the average need is 200 mL per kg, some needing 350 mL per kg or more (WHO 2005a). That is 10 to 17 litres for one adult on day one (arithmetic).

1.2 Case fatality by level of treatment

Setting	Case fatality	Source
No treatment, nineteenth century	about 50%, or more than 50%	Sack 2013, Harris et al. 2012 (abstract)
Calcutta hospital before Rogers' hypertonic saline	59.6%	Rogers 1911 via a secondary source [VERIFY]
Rogers' saline, then with permanganate	32.6%, then 23%	same [VERIFY]

Setting	Case fatality	Source
Goma camps, July 1994	about 12,000 deaths in 58,000 to 80,000 cases	Goma Epidemiology Group 1995 (abstract)
Zimbabwe, Aug 2008 to mid-Jan 2009	5.3%	Ahmed et al. 2011
Zimbabwe, whole epidemic to June 2009	4.3%	WHO 2009 (search summary)
Haiti, Oct 2010 to Oct 2012	1.2%, from 0.6 to 4.6% by department	Barzilay et al. 2013 (abstract)
Target for a treatment centre	below 1%	WHO 2026
Effective modern therapy	below 0.2%	Harris et al. 2012 (abstract)

The brief's lead gives 25 to 50% untreated. The sources read give about 50% (Sack 2013) and more than 50% (Harris et al. 2012). No source read supports a lower bound of 25%. Goma's figures give 15 to 21% by arithmetic on an estimated denominator [VERIFY]. HY-03 adds 3.6% in the Bongaon camp and no deaths in a Dhaka series (THRIVING library, HY-03).

The table says one thing. Fluid replacement, not drugs, carries the fall from 50% to 1%. Antibiotics shorten illness, but no trial in the Cochrane review recorded a death in either arm (Leibovici-Weissman et al. 2014).

1.3 John Snow, London 1854 John Snow, a London anaesthetist, made two studies in 1854. The stronger was the "Grand Experiment" in south London, where two water companies served the same streets. In seven weeks the 40,046 houses supplied by Southwark and Vauxhall, drawing from the Thames at Battersea, had 1,263 cholera deaths, 315 per 10,000 houses. The 26,107 houses supplied by Lambeth, which had moved its intake upstream, had 98 deaths, 37 per 10,000. The rest of London had 59 (Snow 1855, via the UCLA Snow site).

At Broad Street in Soho there were 616 deaths. Snow met the parish Guardians on 7 September 1854 and the pump handle came off on 8 September, when the outbreak was already waning. A leaking cesspit beside the well was found later (Michigan State University Snow archive, search summary). For a village, the lesson is that a map of cases against water sources, and deaths per household by source, are what convict a well.

1.4 Zimbabwe, August 2008 to June 2009 Zimbabwe's epidemic came amid economic collapse, with failed water treatment and closed clinics. There were 95,531 suspected cases and 4,282 deaths. Over two-thirds of deaths were in areas with no treatment facility. Of 93 patients studied, 52.7% arrived severely dehydrated and only 32.3% had taken ORS or sugar-salt solution at home. Responders set up 235 treatment centres. The problems named were overuse of intravenous fluid, inappropriate antibiotics and too few staff. Resistance was 37% to erythromycin and 7% to tetracycline and doxycycline, with none to ciprofloxacin or azithromycin (Ahmed et al. 2011). WHO counted 98,424 cases and 4,276 deaths (WHO 2009, search summary).

Zimbabwe is the nearest modern model of a post-Fall epidemic. Most deaths happened where there was no centre, and most patients had had no ORS at home. Both failures can be fixed by knowledge alone.

1.5 Haiti, October 2010 onward The first case in Haiti was confirmed on 20 October 2010 (CDC, search summary). In two years there were 604,634 cases, 329,697 hospitalisations and 7,436 deaths. Case fatality was 1.2% overall, and the rolling 14-day figure fell to 1.0% within three months. The attack rate reached 6.1% (Barzilay et al. 2013, abstract). By the end there were over 820,000 cases and nearly 10,000 deaths (CDC, search summary). The lesson is speed: deaths were highest before treatment points existed.

1.6 Rehydration volumes HY-03 has the recipes and plans in full. The volumes the cholera chapter needs come from the WHO manual for physicians (WHO 2005a), and are set out as checklists in Protocols P1 and P2.

- **Assessment.** Four signs: general condition, eyes, thirst, skin pinch. Two or more "some" signs mean a deficit of 5 to 10% of body weight (50 to 100 mL per kg). Two or more "severe" signs mean over 10%.
- **Some dehydration.** 75 mL per kg of ORS over 4 hours.
- **Severe.** 100 mL per kg of Ringer's lactate, or normal saline if there is none. Infants: 30 mL per kg in 1 hour, then 70 in 5 hours. Older patients: 30 in 30 minutes, then 70 in 2.5 hours. A 50 kg adult with cholera gets 2 litres in 30 minutes and the rest of 5 litres within 3 hours.
- **No drip.** ORS by nasogastric tube, or by mouth, at 20 mL per kg per hour for 6 hours (120 mL per kg). If no better after 3 hours, the patient needs a drip.
- **Ongoing losses.** Replace what goes out. MSF gives 200 to 250 mL per stool (THRIVING library, HY-03). Stool above 15 to 20 mL per kg per hour defeats oral therapy (WHO 2005a).
- **Overload.** Puffy eyelids. Stop ORS for a while and give breast milk or water.

The brief's lead figures match. "100 mL per kg in 3 to 6 hours" is the severe plan, and "50 to 100 mL per kg over 4 hours" is the deficit range for some dehydration, where WHO works with 75.

Rice-based ORS is better than standard ORS in cholera, though not in other childhood diarrhoea (WHO 2005a). HY-03 reports about a third less stool in adult cholera. HY-03 also records David Nalin's warning that low-sodium solutions underdose adults with cholera: among 48,511 patients he counted 47 seizures from low sodium against 1 from high (THRIVING library, HY-03). The household recipe (half a level 5 mL teaspoon of salt per litre, about 51 mmol/L sodium) is safe for children but may run short for heavily purging adults. I give no stronger home recipe, because a strong mix is the error that kills infants. Adults should get salted rice water and salted food as soon as they can eat [VERIFY: my inference].

1.7 The cholera cot David Sack credits Robert Watten with the cholera cot: an army cot with a hole in the middle and a plastic sheet that funnels stool into a bucket, so output can be measured. It served the Bangkok, Calcutta and Dacca studies (Sack 2013). MSF specifies a hole of 20 cm for adults and 10 cm for children, a bed no higher than 70 cm to limit splashing, a washable surface, a second bucket for vomit, and mats burned after each patient (MSF Appendix 13). The cot keeps the patient dry without moving them, contains the stool and lets a lay healer measure losses in a marked bucket. It can be made from poles and cloth.

1.8 Antibiotics for cholera The GTFCC note of October 2022 says antibiotics shorten diarrhoea by about 1.5 days, cut stool volume by up to 50% and shorten shedding to 1 to 2 days. They are for patients with severe dehydration, heavy purging (at least one stool an hour in the first 4 hours), failure of the first 4 hours of rehydration, or who are pregnant, severely malnourished, HIV-positive or over 60 (GTFCC 2022).

Drug	Adults, including pregnant women	Children
Doxycycline (first choice if the strain is sensitive)	300 mg once	2 to 4 mg per kg once
Azithromycin	1 g once	20 mg per kg once, maximum 1 g
Ciprofloxacin	1 g once	20 mg per kg once, maximum 1 g

Source: GTFCC 2022. WHO's 2005 manual gives the same adult doxycycline dose of 300 mg once. For children it gives tetracycline 12.5 mg per kg four times a day for 3 days, or erythromycin (WHO 2005a). The sources agree for adults and differ for children. The 2022 note gives single-dose doxycycline to children and pregnant women, which older guidance avoided [VERIFY: the reasoning was not read]. Give the first dose once vomiting stops, usually 4 to

6 hours into rehydration (WHO 2005a). Doxycycline cost under 10 US cents a course and azithromycin about 70 cents (GTFCC 2022).

A Cochrane review of 39 trials (4,623 participants) found that antibiotics shortened diarrhoea by 36.77 hours, halved stool volume (ratio 0.50), cut fluid needs (ratio 0.60), and reduced clinical failure (risk ratio 0.21) and bacteriological failure (0.25). No trial reported deaths. Single-dose azithromycin shortened diarrhoea by about 32 hours against ciprofloxacin (Leibovici-Weissman et al. 2014). In Dhaka, among 195 men with severe cholera, azithromycin 1 g gave clinical success in 73% against 27% for ciprofloxacin 1 g, with median diarrhoea of 30 against 78 hours and stool of 114 against 322 mL per kg (Saha et al. 2006, abstract). That is one extra success for about every two patients (arithmetic). The ciprofloxacin MIC in Bangladesh rose 83-fold in ten years, while azithromycin resistance stayed below 1% (GTFCC 2022).

No number needed to treat to prevent a death can be computed, because the trials recorded none. The gain is fewer litres to make and carry, and shorter shedding.

Antibiotics harm through resistance. Goma's 1994 strains resisted tetracycline and doxycycline (Goma Epidemiology Group 1995). In Douala in 2004, 174,644 people got prophylaxis with no visible effect on the epidemic curve, and the GTFCC does not recommend mass prophylaxis (GTFCC 2022).

1.9 Zinc WHO gives children with diarrhoea zinc 10 to 20 mg a day for 10 to 14 days (WHO 2005a), and HY-03 gives 10 mg under 6 months and 20 mg above. The GTFCC gives 20 mg a day for 10 days to children aged 6 months to 5 years with cholera, with the antibiotic 2 hours before or 4 to 6 hours after the zinc (GTFCC 2022). In Dhaka, 179 children with cholera given 30 mg a day had diarrhoea for 64.1 hours against 72.8 on placebo, 12% shorter, and 81% against 68% had recovered by day 3 (Roy et al. 2008, abstract). Worth giving from stock, not worth a journey.

1.10 Chlorine at a cholera centre Drinking water: one drop of 5% bleach per litre of clear water, two of cloudy, 30 minutes' contact, aiming at a residual of at least 0.5 mg/L. Bleach can differ from its label by 35% on average (THRIVING library, HY-02). For the centre, MSF uses four strengths. The table's layout was garbled in the copy read, so the matching of strength to use is my reading [VERIFY]:

Strength	Use	From HTH granules (65 to 70%)
0.05%	hands, laundry	15 g in 20 L
0.2%	floors, beds, surfaces	60 g in 20 L
2%	stool and vomit buckets, bodies	600 g in 20 L
1%	stock for water	15 g per litre

To make 0.2% from household bleach, MSF gives 1 part to 19 parts water for 4% bleach, 1 to 16 for 3.5% and 1 to 12 for 2.6%. Allow 15 minutes' contact, make solutions fresh daily and never mix two chlorine products (MSF Annexe 15). For 5% bleach the arithmetic gives 1 part to 24 [VERIFY: not in the source].

1.11 Safe burial In Guinea-Bissau in 1994 (15,878 cases, 306 deaths), the attack rate after funerals of bodies not disinfected was 2.6 times higher (95% confidence interval 1.9 to 3.8). Touching the body carried an odds ratio of 36.2 (2.6 to 1,769). Eating at the funeral gave 14.5, not significant. The authors recommended no funeral meals and disinfection of bodies (Gunnlaugsson et al. 1998). A 2018 outbreak in Chegutu, Zimbabwe, was again linked to a funeral (CDC 2018, search summary). A Somali guide uses 0.2% chlorine to wash the body, gloves, cotton soaked in solution in mouth and anus, a plastic wrap and no handling by the family (Somalia WASH cluster 2011, secondary). MSF uses 2% for bodies (MSF Annexe 15). The two differ tenfold [VERIFY]. Both agree on the principle: a small gloved team prepares the body, the family watches, and nobody eats.

1.12 Outbreak strategy Household contacts of a case in Dhaka had over 100 times the general risk in the following week. Case-area targeted intervention (CATI) therefore sends a team to a ring of 100 to 250 m around each case household for 7 days, with water treatment, hygiene and education (Epicentre). A GTFCC slide credits a 2018 modelling study by Finger and colleagues with a 68% shorter epidemic from a 100 m response [VERIFY: not read]. The GTFCC roadmap aims at 90% fewer deaths by 2030 (GTFCC 2017). A single-dose oral vaccine has been in use since October 2022 (WHO 2026). It will not exist after the Fall.

2. Typhoid

2.1 Osler's record William Osler's textbook of 1892 gives the pre-antibiotic picture (Osler 1892). Mortality ran 10 to 30%: nearly 19% in Charles Murchison's London series and 11.2% over 20 years at the Montreal General Hospital. The fever climbs in steps over the first week. Ernst Brand's cold baths cut hospital mortality to 5 to 6%. In Brisbane, Hare recorded 14.8% among 1,838 patients treated expectantly and 7% among 797 bathed strictly. Sewering and a new water supply halved typhoid mortality in Munich.

- **Perforation.** In 114 of 2,000 Munich typhoid autopsies (5.7%) and 15 of Osler's 64 fatal cases. Usually at the end of week 2 or in week 3, but seen from day 8 to week 6. Signs: sudden acute pain, collapse, a swollen rigid belly, vomiting, a rapid small pulse, a falling temperature, loss of the dull note over the liver. Osler wrote that "recovery from perforation is undoubtedly possible, though rare."
- **Haemorrhage.** In 3 to 5%, from the end of week 2 to the start of week 4, fatal in 30 to 50% of these. The temperature could fall by 8 to 10°F.
- **Relapse.** From 3% (Murchison) to 15 to 18% (Immermann), after a fever-free interval of about 5 to 11 days. Relapses rarely killed.

2.2 The modern record A 2020 systematic review found complications in 26.3% of 10,355 hospitalised patients. Case fatality without perforation was 2.0% (Asia 0.9%, Africa 5.4%). Perforation occurred in 1.3% (Asia 0.7%, Africa 7.6%), with a median case fatality of 15.5% (Africa about 20%, Asia 4.6%). Encephalopathy ran at 3.6%, gut haemorrhage 3.1% and shock 1.9%. In Asia, longer delay to care went with higher fatality (r = 0.84) (Marchello et al. 2020).

2.3 Perforation and surgery Leyden proposed operating on typhoid perforation in 1884. Early operative mortality was 73 to 88% in the series of Keen, Finney and Monod. It was over 50% in 1960 and is now in single figures in some countries. Delay beyond 72 hours raised mortality about six-fold (Ukwenya et al. 2011, abstract). A village cannot close a bowel. It can recognise perforation, stop food and drink, give fluid and an antibiotic, and send for a surgeon if one exists [VERIFY: the non-operative regime is my inference, not from a source read].

2.4 Chloramphenicol, 1948 In 1948 Theodore Woodward, Joseph Smadel and colleagues treated 10 typhoid patients in Malaya with chloramphenicol. Fever cleared in an average of 3.5 days. Two relapsed and responded to a second course (Woodward et al. 1948, via a secondary account). It was the typhoid drug for 30 years. Its harm is fatal aplastic anaemia, in about 1 in 24,200 to 40,500 courses on the label's figures (Fresenius Kabi label, search summary), and grey baby syndrome in newborns. It may be in salvaged stock. This report did not verify a typhoid dose and gives none.

2.5 Dexamethasone for severe typhoid In Jakarta, Hoffman and colleagues gave dexamethasone 3 mg per kg to patients with delirium, stupor, coma or shock. Deaths fell from 10 of 18 (55.6%) to 2 of 20 (10%) (Hoffman et al. 1984, abstract). Of 68 randomised, only 38 were analysed, and it has not been repeated at this scale. The follow-up doses were not read [VERIFY].

2.6 Azithromycin and ceftriaxone

Drug	WHO pocketbook update 2012	BMJ Best Practice
Azithromycin, by mouth	20 mg per kg a day for 5 to 7 days	8 to 20 mg per kg a day, maximum 1 g
Ceftriaxone, injection	80 mg per kg a day for 5 to 7 days	50 to 100 mg per kg a day

Both were read only through search summaries. They agree at the top of the range and differ at the bottom. A Cochrane review found azithromycin had fewer clinical failures than fluoroquinolones (odds ratio 0.48, 564 participants) and fewer relapses than ceftriaxone (odds ratio 0.09, 132 participants) (Effa and Bukirwa 2011, abstract). Europe PMC now lists that review as withdrawn, so its figures need checking against its successor [VERIFY]. Azithromycin is oral and stable. After the Fall it is the typhoid drug to hold.

2.7 Extensively drug-resistant typhoid, Pakistan 2016 From November 2016, Sindh province saw over 300 cases of an H58 typhoid strain resistant to chloramphenicol, ampicillin, co-trimoxazole, fluoroquinolones and ceftriaxone. Only azithromycin and the carbapenems remained (Klemm et al. 2018). By December 2018 there were 5,274 cases, 69% in Karachi and 27% in Hyderabad (WHO 2018, search summary). An azithromycin-resistant strain of this kind has since been reported [VERIFY: seen only in a search result]. If such strains spread, the village is back with Osler: nursing, fluid, cooling, clean water and the surgeon.

2.8 The carrier Two to five per cent of those who recover from enteric fever become chronic carriers, with organisms in the gallbladder. A Pakistani study found typhoid DNA in 3.4% of gallbladders removed (Aga Khan University carrier study 2024). In New York State from 1945 to 1963, cholecystectomy cured at least 30 of 34 carriers followed up (88.2%), among 54 operated on, with 2 deaths (Freitag 1964, search summary). Mary Mallon, a New York cook, infected many households and was isolated for over two decades (Origins, Ohio State University, search summary) [VERIFY]. A village cannot remove a gallbladder. It can keep anyone who has had typhoid out of a kitchen that feeds others, and insist on soap after the latrine.

3. Shigella dysentery

3.1 The organism and the toxin WHO's 2005 guideline estimated at least 80 million cases and 700,000 deaths a year, about 70% of cases and 60% of deaths in children under 5. As few as 200 organisms cause disease, and stool carries 10^6 to 10^8 per gram, so shigella spreads hand to mouth without needing water. Case fatality is under 1% in outpatients and up to 15% in hospitalised *Shigella dysenteriae* type 1 (Sd1), higher with delay or the wrong drug. Sd1 makes Shiga toxin, which causes haemolytic uraemic syndrome (HUS): little urine, bleeding and pallor. Death is likelier in infants, adults over 50, children not breastfed, the malnourished, children after measles, and the dehydrated or unconscious (WHO 2005b).

3.2 Central Africa in the 1990s In 11 refugee camps in Rwanda, Burundi, Tanzania and Zaire from November 1993 to February 1995 there were 181,921 cases of bloody diarrhoea. Attack rates were 6.3 to 39.1% and case fatality 1.5 to 9.0%, reaching 18.3% in children under 5 at Inera. At Kibumba, with the 39.1% attack rate, people had 0.5 litres of water a day each, 500 shared a latrine and rations were 800 kcal. Resistance to nalidixic acid was close to 100%, and epidemics lasted a median of 27 weeks (Kernéis et al. 2009). In Goma in July 1994, 500,000 to 800,000 refugees arrived and almost 50,000 died in the first month, 20 to 35 per 10,000 a day. Cholera came first, then shigella (Goma Epidemiology Group 1995, abstract). The camps show what drives shigella: too little water for hands, too many people per latrine, too little food, and resistant strains.

3.3 Antibiotics Every case of bloody diarrhoea in a shigella epidemic should get an antibiotic to which the local strain is sensitive (WHO 2005b).

Drug	WHO 2005b	MSF
Ciprofloxacin, first line	children 15 mg per kg, adults 500 mg, twice daily, 3 days	the same, maximum 1 g a day
Ceftriaxone, injection	50 to 100 mg per kg once daily, 2 to 5 days	50 to 100 mg per kg (maximum 1 g), adults 1 to 2 g, 3 days, first choice in pregnancy
Azithromycin	6 to 20 mg per kg (adults 1 to 1.5 g), 1 to 5 days	second line: 12 mg per kg day 1, then 6 mg per kg for 4 days (adults 500 then 250 mg)

They agree on ciprofloxacin and differ on azithromycin. WHO's annex gives ciprofloxacin in 250 mg tablets twice daily for 3 days: under 1 year half a tablet, 1 to 4 years one, 5 years and over two (WHO 2005b). If there is no improvement within 48 hours, change drug. If the second drug fails after 48 hours, treat for amoebiasis (MSF Shigellosis). Drugs that do not work against shigella include metronidazole, tetracyclines, chloramphenicol, sulfonamides, amoxicillin and nalidixic acid (WHO 2005a). A Rwandan cohort of 849 hospitalised patients in 1994 had 13.2% case fatality, 12.2% on nalidixic acid against 2.2% on ciprofloxacin (Epicentre Rwanda study, search summary) [VERIFY].

3.4 The antimotility rule WHO says loperamide, diphenoxylate and paregoric must never be used for shigellosis (WHO 2005b). The physicians' manual adds tincture of opium and codeine: these drugs can cause fatal paralytic ileus, prolong infection and poison the child's brain, and none should be given to children (WHO 2005a). MSF calls all opioids contraindicated (MSF Shigellosis). DuPont and Hornick gave diphenoxylate with atropine to volunteers infected with shigella, and fever and shedding lasted longer (DuPont and Hornick 1973, via the Lomotil label). A meta-analysis found serious harm from loperamide (ileus, lethargy, death) in 8 of 927 children against none of 764 on placebo, all 8 under 3 years old (Li et al. 2007). Opium was a mainstay of nineteenth-century dysentery treatment and will be among the first things a village can make or salvage. The rule must be learned by heart. Kaolin, charcoal and smectite have no practical value (WHO 2005a).

3.5 Complications WHO's guideline gives (WHO 2005b): for blood glucose below 2.2 mmol/L, 2 mL per kg of 25% glucose. For sodium below 120 mmol/L, 3% saline 12 mL per kg over 4 hours (needs a laboratory). For seizures, paraldehyde 0.2 mL per kg. Toxic megacolon, a swollen silent belly, kills up to 33%. In HUS, restrict fluid to losses. MSF puts febrile seizures at 5 to 30% and rectal prolapse at about 3% (MSF Shigellosis).

3.6 Feeding and control Feeding continues through dysentery: MSF aims at 2,500 kcal a day for inpatients and 1,000 for outpatients (MSF Shigellosis). Children get zinc 10 to 20 mg a day for 14 days (WHO 2005b). The old practice of starving dysentery is graded X. Chemoprophylaxis of contacts is never indicated, cordons sanitaires do not work, and shigella dies quickly when dried or in direct sun (WHO 2005b). Control rests on soap, enough water, latrines and fast treatment.

4. Amoebic dysentery and liver abscess

4.1 When to suspect it Amoebiasis causes under 3% of bloody diarrhoea in young children. Treat for it only when a microscope shows trophozoites that have eaten red cells, or after two shigella drugs have failed (WHO 2005a). Liver abscess follows in 3 to 9% of invasive cases (StatPearls, search summary) [VERIFY]: fever, pain under the right ribs, a large tender liver.

4.2 Metronidazole and tinidazole

Source	Metronidazole	Duration
WHO 2005a	children 10 mg per kg, adults 750 mg, three times daily	5 days, 10 if severe
MSF essential drugs	children 15 mg per kg, adults 500 mg, three times daily	5 days gut, 5 to 10 days liver
Liver abscess review 2012	adults 750 mg three times daily, children 35 to 50 mg per kg a day	7 to 10 days

The sources differ by up to half on the adult dose. MSF gives tinidazole 50 mg per kg (maximum 2 g) or 2 g once daily, for 3 days in gut disease and 5 days for liver abscess (MSF essential drugs). Afterwards, paromomycin 500 mg three times daily for 7 days clears cysts that otherwise persist in 40 to 60%. About 15% of liver abscesses fail drugs alone (search summaries) [VERIFY].

4.3 Emetine from ipecacuanha Ipecacuanha is the root of *Carapichea ipecacuanha*, a small Brazilian forest shrub. Its alkaloid emetine kills amoebae. In 1912 Leonard Rogers in Calcutta reported the rapid cure of amoebic dysentery and hepatitis by hypodermic injection of soluble emetine salts (Rogers 1912, record only). It was the amoebiasis drug for half a century. It harms the heart. It accumulates, is still excreted 40 to 60 days after a course, and causes heart failure, arrhythmia and fatal myocarditis, so ECG monitoring was required. Secondary sources give 1 mg per kg a day, maximum 60 mg, for 4 to 6 days, and a lethal dose of about 10 to 25 mg per kg [VERIFY: secondary only]. Even dehydroemetine damaged the heart (Dempsey and Salem 1966, record only). It is toxic to the foetus. After the Fall, emetine is a historical note: a village without an ECG and a standardised preparation should not attempt it.

5. Plants and foods

Tradition on every continent treats diarrhoea with astringents, opium and starvation. The record supports none as a cure. Two foods have good trial evidence and one alkaloid weak evidence.

5.1 Green banana *Musa* species, unripe fruit, cooked. Its resistant starch ferments in the colon into short-chain fatty acids, which help the colon absorb salt and water. GH Rabbani's group in Dhaka ran four trials:

- 62 boys with persistent diarrhoea, cooked green banana 250 g per litre of diet or pectin, against diet alone: recovery by day 3 in 55% and 59% against 15% (Rabbani et al. 2001, abstract).
- Stool weight halved and gut permeability improved (Rabbani et al. 2004, abstract).
- 73 children with shigellosis, all on ciprofloxacin: success 85% against 67%, blood cleared by day 5 in 96% against 60% (Rabbani et al. 2009, abstract).
- A cluster trial among 2,968 children at home: acute diarrhoea recovered by day 3 in 79.9% against 53.3% (Rabbani et al. 2010, abstract).

One group, one country, but randomised and consistent. Grade A as a food with ORS in childhood diarrhoea. Not tested as a substitute for rehydration in cholera.

5.2 Rice water and rice ORS *Oryza sativa*, grain, boiled. Rice ORS with salt reduces cholera stool and is preferred in cholera (WHO 2005a, THRIVING library, HY-03). Unsalted rice water is a home fluid for prevention, not treatment. "Rice water saved us" is survivor bias: those who drank it and died tell no story, and 80% of cholera cases are mild (GTFCC 2022). Grade A for salted rice ORS in cholera. Grade D for unsalted rice water as treatment.

5.3 Berberine An alkaloid of the root and stem bark of barberries (*Berberis vulgaris*, *B. aristata*), goldenseal (*Hydrastis canadensis*) and goldthread (*Coptis* species) [VERIFY: plant list from general knowledge]. In animals it inhibited toxin-driven secretion by about 70% (Sack and Froehlich 1982, abstract). In 1987, Rabbani's group treated 165

Dhaka adults. In toxigenic *E. coli* diarrhoea, 400 mg once reduced stool, and 42% against 20% had stopped by 24 hours. In cholera, 400 mg cut stool in the second 8 hours from 2.79 to 2.22 litres, and 1,200 mg added nothing to tetracycline. The authors called the effect slight (Rabbani et al. 1987, abstract). In Rangoon, among 400 adults, tetracycline worked in cholera and berberine had no antisecretory effect. In non-cholera diarrhoea neither beat placebo (Khin-Maung-U et al. 1985, abstract). Berberine causes or worsens newborn jaundice and kernicterus and must not be given to infants, in pregnancy or when breastfeeding (NCCIH). Grade D in cholera, C in toxigenic *E. coli*, X for infants and pregnancy.

5.4 Guava leaf *Psidium guajava*, leaf. Used in at least 44 countries, with no known safe dose for children (Liu et al. 2024). In Mexico, Lozoya and colleagues gave 50 adults a quercetin-standardised leaf extract, 500 mg every 8 hours for 3 days. Only the duration of abdominal pain fell, not stool frequency. The effect is antispasmodic (Lozoya et al. 2002, abstract). The brief's lead is confirmed. Grade C for colicky pain, D for stopping diarrhoea. No dangerous lookalike was found in the sources read [VERIFY].

5.5 Pomegranate rind *Punica granatum*, fruit rind. Tannin-rich and a classic astringent from Iran to India. No human trial in infectious diarrhoea was found. A crossover trial of an Ayurvedic blend of curry, pomegranate and turmeric in 32 patients with irritable bowel and diarrhoea found no difference from placebo (Lauche et al. 2016, abstract). The root and stem bark contain other alkaloids and are not the rind [VERIFY]. Grade D. Astringents may firm the stool while fluid still pours into the gut [VERIFY: inference].

6. The pitfalls in the brief

Under-rehydration (1.4, 1.6), the over-salty home mix (HY-03), opium, loperamide and kaolin (3.4), antibiotics for every loose stool (1.8 and WHO 2005a, which limits them to bloody diarrhoea and severe suspected cholera), small plant trials read as cures (5.3, 5.4), survivor bias (5.2) and the missed week-3 perforation (2.1, Red flags) are each answered above.

Evidence grades

A: randomised trials or systematic reviews. B: consistent observational or clinical series, including the pre-antibiotic record. C: convergent tradition with plausible pharmacology. D: single tradition, anecdote or theory. X: shown ineffective or harmful.

Practice	Grade	Tradition says	Record shows	Science infers
ORS by mouth or tube, by weight	A	salted and sweet drinks	cholera deaths from about 50% to under 1%	glucose-coupled sodium uptake survives the toxin
Intravenous Ringer's lactate	A	none	Rogers halved hospital deaths [VERIFY]	replaces volume when the gut cannot
Rice ORS with salt, cholera	A	rice gruel in Asia	about a third less stool	slow glucose release
Cholera cot and measured replacement	B	none	Bangkok, Calcutta, Dacca studies	measuring prevents under-replacement
Single-dose doxycycline or azithromycin, severe cholera	A	none	37 hours shorter, half the stool	kills shedding vibrios

Practice	Grade	Tradition says	Record shows	Science infers
Mass antibiotic prophylaxis	X	none	no effect in Douala	breeds resistance
Zinc for children	A	none	12% shorter cholera	restores gut function
Chlorinated water	A	boiling, sun	Snow: 8.5-fold difference in deaths (arithmetic)	kills vibrio and salmonella
Safe burial, no funeral meal	B	wash and feast the dead	odds ratio 36 for touching the body	bodies leak infected fluid
CATI ring response	B	none	household risk over 100-fold	spread is local and fast
Azithromycin or ceftriaxone, typhoid	A	none	fewer failures and relapses	sensitive strains
Chloramphenicol, typhoid	A, X in newborns	none	fever gone in 3.5 days, 1948	rare fatal marrow failure
Dexamethasone, severe typhoid	A, one small trial	none	deaths 56% to 10%	damps the inflammatory storm
Brand cold baths	B	cold water for fever	14.8% to 7% in Brisbane	nursing and fever control
Surgery for perforation	B	none	80% operative deaths in the 1890s, single figures now	must be early
Ciprofloxacin, ceftriaxone, azithromycin, shigella	A	none	12.2% against 2.2% deaths in Rwanda [VERIFY]	sensitive strains
Opium, loperamide, diphenoxylate in dysentery	X	opium for the flux	ileus and child deaths, longer shedding	stasis holds toxin and organism
Kaolin, charcoal	X	clays, charcoal	no practical value	stool firmer, losses continue
Starving dysentery	X	rest the bowel	800 kcal camps lost children	wasting raises deaths
Metronidazole or tinidazole, invasive amoebiasis	A [VERIFY: no trial read]	none	standard treatment in all manuals read	kills tissue amoebae
Emetine	B for effect, X after the Fall	ipecac root	Rogers' cures, then heart deaths	cardiotoxic
Green banana	A	plantain in the tropics	four Dhaka trials	resistant starch
Berberine, cholera	D	Indian and Chinese bark medicine	slight or no effect in two trials	partial antisecretory in animals
Berberine, toxigenic *E. coli*	C	same	one positive trial	same
Guava leaf, pain	C	44 countries	pain shorter, stools unchanged	antispasmodic

Practice	Grade	Tradition says	Record shows	Science infers
Pomegranate rind	D	astringent across Asia	no human trial	tannin in rodents
Unsalted rice water as treatment	D	universal	survivor stories	water without salt does not restore volume

Means ledger

Rungs: (1) hands and knowledge alone, (2) hearth, (3) garden and still, (4) village dispensary, (5) district infirmary, (6) hospital before the Fall.

Remedy	1	2	3	4	5	6
Rehydration	four signs, any clean fluid, breastfeeding	boiled water, salt and sugar by fixed spoon, rice gruel	scale for salt, rice ORS in bulk, marked jugs	ORS packets, nasogastric tube, cholera cot	intravenous Ringer's or saline	pumps, measured electrolytes
Cholera cot	mat over a pit	sheet with a hole over a bucket	wooden cot, marked bucket	output charted	with drip	same
Cholera antibiotics	none	none	none	salvaged doxycycline or azithromycin	same	culture and sensitivity
Zinc	none	none	none	salvaged tablets	same	same
Chlorine	boil instead	bleach drops of known strength	1% stock, scale	0.05, 0.2 and 2% daily	residual testing	treated mains
Safe burial	no touching, no meal	cloth and plastic gloves, soap	chlorine wash	burial team	same	same
Typhoid antibiotics	none	none	none	salvaged azithromycin or chloram-phenicol	ceftriaxone	carbapenem, culture
Perforation	recognise, nothing by mouth	keep still and cool	none more	drip, antibiotics	laparotomy if a surgeon exists	early surgery, intensive care
Shigella antibiotics	none	none	none	salvaged ciprofloxacin, azithromycin	ceftriaxone	culture-guided
Amoebiasis	none	none	none	microscope, metronida-zole	abscess drainage	imaging

Remedy	1	2	3	4	5	6
Green banana	none	cook and mash	grow plantains	stock	same	not used
Berberine, guava, pomegranate	identify plant	decoction	dried stock	no standard dose [VERIFY]	same	not used

What each rung changes. Knowledge alone changes cholera most: the four signs, early fluid and no funeral meal turn a 50% disease into one that kills a few per cent. The hearth adds the measured recipe and rice ORS. The dispensary's nasogastric tube lets a lay healer treat severe dehydration without a drip, its microscope separates amoebae from shigella, and its antibiotics shorten cholera and save lives in shigella and typhoid. Only rung 5 or 6 can repair a perforation, and only with a surgeon.

Harm test

Remedy	How it harms	Never give to	Signs	What to do	Recorded harm
Home ORS	too much salt or sugar	no one, but infants need exact mixing	extreme thirst, irritability, doughy skin, seizures	stop, remake, keep breastfeeding	infant deaths in Amsterdam and Kashmir (HY-03)
Fast fluid by tube or drip	overload, aspiration, drip infection	severely malnourished need slower rates (HY-03)	puffy eyelids, fast breathing, swollen belly	stop, sit up, slow	intravenous overuse in Zimbabwe
Doxycycline	gullet ulcer if taken lying down [VERIFY]	none for one dose (GTFCC 2022)	heartburn	take upright with water	resistance at Goma
Ciprofloxacin	tendon damage [VERIFY], resistance	pregnancy where ceftriaxone exists (MSF)	tendon pain	stop	83-fold MIC rise in Bangladesh
Chloramphenicol	aplastic anaemia, grey baby	newborns	bleeding, pallor	stop	1 in about 24,000 to 40,000 courses
Opium, loperamide, diphenoxylate	ileus, longer infection, poisoning	anyone with bloody diarrhoea, all children	swollen silent belly, drowsiness	stop, nothing by mouth, fluid	8 serious events in 927 children
Metronidazole	nausea, reaction with alcohol [VERIFY]	first trimester where avoidable [VERIFY]	vomiting, confusion	stop	none found
Emetine	heart failure, arrhythmia, death	anyone without ECG, pregnancy	fast pulse, breathlessness	stop, rest	fatal myocarditis

Remedy	How it harms	Never give to	Signs	What to do	Recorded harm
Berberine	newborn jaundice, kernicterus	infants, pregnancy, breastfeeding	yellow baby	stop, feed	NCCIH warning
Chlorine solutions	burns, toxic gas if mixed with acid [VERIFY]	none	cough, red eyes	fresh air, wash	none in sources read
Dexamethasone	may mask perforation [VERIFY]	non-severe typhoid	sudden pain, black stool	stop	none in the trial abstract
Green banana	none recorded	none	none	none	none

Red flags

Cholera and watery diarrhoea - Unconscious, floppy or unable to drink: severe dehydration. Give ORS by tube at 20 mL per kg per hour while seeking a drip (WHO 2005a). - No radial pulse: shock. Fluid by the fastest route you have. - Stool above 15 to 20 mL per kg per hour: oral therapy will fail (WHO 2005a).

Typhoid - In week 2 or 3, sudden severe belly pain, a hard belly, vomiting, a fast pulse and a falling temperature: perforation (Osler 1892). - Fainting, pallor, a sudden fall in temperature, blood in the stool: haemorrhage (Osler 1892). - Delirium, stupor, coma or shock: severe typhoid (Hoffman et al. 1984).

Dysentery - Infants, adults over 50, the malnourished, children after measles (WHO 2005b). - Seizures or drowsiness: low sugar or low sodium. - Little urine, pallor, bruising: HUS. - A tight, swollen, silent belly: toxic megacolon, up to 33% fatal (WHO 2005b). - No better after 48 hours on an antibiotic: wrong drug or amoebae.

Liver abscess: fever and pain under the right ribs with a tender enlarged liver.

What to do anyway, and honest comfort. Keep giving fluid, keep the patient clean and turned, and keep the family away from the stool and close to the face. For typhoid perforation without a surgeon, Osler's record shows that a few lived. Keep the patient still, propped up, with nothing by mouth, fluid by drip if possible, and an antibiotic if one exists [VERIFY: inference]. Relieve pain. Opium is forbidden in dysentery, but for a dying patient with a perforation comfort is the aim [VERIFY: my inference]. Tell the family the truth: most perforations killed before surgery existed, some lived, and nothing they did caused it.

The case against

Against the romance of the hospital. 1. Intravenous fluid is not the answer for most patients. Zimbabwe's responders overused it (Ahmed et al. 2011). Haiti's case fatality fell to 1% within three months, largely through oral treatment (Barzilay et al. 2013). 2. Antibiotics have not been shown to save lives in cholera: 39 trials reported no deaths (Leibovici-Weissman et al. 2014), and the GTFCC rejects mass prophylaxis (GTFCC 2022). 3. David Werner and David Sanders argued in *Questioning the Solution* (1997) that packet ORS served suppliers better than villages and neglected water, sanitation and poverty (THRIVING library, HY-03) [VERIFY: book not read]. After the Fall their side wins by default. 4. David Nalin argues that low-sodium solutions run short for adult cholera (THRIVING library, HY-03). If he is right, the safe home recipe for children is not enough for adults.

Against the romance of the herbal. 5. Khin-Maung-U and colleagues found berberine useless in non-cholera diarrhoea and without antisecretory effect in cholera, and Rabbani's own group called its effect slight (Khin-Maung-U et al. 1985, Rabbani et al. 1987). 6. Lozoya's guava trial, the best in its field, moved pain, not diarrhoea (Lozoya

et al. 2002). Liu, Jullian and Chassagne found no known safe dose for children (Liu et al. 2024). 7. The tradition of opium and starvation in dysentery has been shown harmful (WHO 2005a, Li et al. 2007).

Against the heroic story. 8. Snow's pump handle came off when the outbreak was already falling. The water-company comparison is the evidence. 9. Hoffman's dexamethasone trial analysed 38 of 68 patients (Hoffman et al. 1984). 10. Green banana rests on one Dhaka group. No replication by another team was found [VERIFY].

Today against after the Fall. Today the answer is clean water, ORS, one dose of the right antibiotic and early surgery for perforation. After the Fall water and ORS remain and matter more. Antibiotics last as long as salvaged stock, and resistance (XDR typhoid, nalidixic acid-resistant shigella, tetracycline-resistant cholera) may have spent them already. Surgery exists only where a surgeon survives.

Plant identification

Plant	Latin binomial	Part	Dangers and lookalikes
Guava	*Psidium guajava*	leaf	none dangerous found [VERIFY]
Pomegranate	*Punica granatum*	fruit rind	do not use root or stem bark [VERIFY]
Barberry and others	*Berberis vulgaris*, *B. aristata*, *Hydrastis canadensis*, *Coptis* species	root and stem bark	toxic to infants [VERIFY: species list]
Banana, plantain	*Musa* species	unripe fruit, cooked	none
Rice	*Oryza sativa*	grain	none
Ipecacuanha	*Carapichea ipecacuanha*	root	cardiotoxic, not for village use

10-line summary

1. Fluid, not drugs, takes cholera from about 50% to under 1% case fatality.
2. Assess by four signs, then give 75 mL per kg over 4 hours for some dehydration and 100 mL per kg for severe.
3. Cholera can need 200 to 350 mL per kg in the first day. Measure losses on a cholera cot and replace them.
4. One adult dose of doxycycline 300 mg or azithromycin 1 g halves cholera stool, but no trial has shown that it saves lives.
5. Funerals spread cholera. Touching the body raised the odds 36-fold in Guinea-Bissau.
6. Untreated typhoid killed 10 to 30%, and perforation in weeks 2 to 3 was a leading cause.
7. Azithromycin by mouth is the typhoid drug to stock. XDR typhoid since 2016 limits the choice.
8. Bloody diarrhoea in an outbreak needs a drug the strain is sensitive to, usually ciprofloxacin for 3 days.
9. Never give opium, loperamide or diphenoxylate in dysentery or to a child.
10. Green banana has good trial evidence. Berberine, guava and pomegranate do not cure diarrhoea.

Open questions

- How much salt should a home recipe carry for an adult with cholera? Nalin and WHO disagree.
- What was untreated cholera case fatality in whole populations, not hospitals? The 25% lead was not confirmed.
- What is Sd1 case fatality with no antibiotic at all? Not found.
- How many typhoid perforations survive without surgery? Osler says some, with no figure.
- What risk does single-dose doxycycline carry in pregnancy and childhood? The 2022 reasoning was not read.
- Has green banana been replicated outside Dhaka?
- Do astringents hide continuing fluid loss? No study found.

Sources to read in full

1. WHO 2005a, *The treatment of diarrhoea*. Plans, drugs, warnings.
2. GTFCC 2022, note on antibiotics for cholera.
3. WHO 2005b, *Guidelines for the control of shigellosis*.
4. MSF, *Management of a cholera epidemic* (2018 and online appendices). Not read as a whole here.
5. Osler 1892, typhoid chapter.
6. Ahmed et al. 2011 on Zimbabwe.
7. Kernéis et al. 2009 on the Central African camps.
8. Marchello et al. 2020 on typhoid complications.
9. Gunnlaugsson et al. 1998 on funerals.
10. Snow 1855, *On the Mode of Communication of Cholera*.

At the bedside after the Fall

Household. Needs: the four signs, a fixed salt spoon and litre jug, sugar, rice, fuel, bleach of known strength, soap. Give ORS early and generously, keep breastfeeding, feed through dysentery with cooked green banana where it grows, never give opium or loperamide, and keep anyone who has had typhoid out of the shared kitchen. First failure to expect: a solution too salty for the baby, or too little for the adult.

Village of 300. Needs: a lay healer with this book, a cholera room downhill of the water, two or three cholera cots, buckets marked in litres, nasogastric tubes if salvaged, daily chlorine solutions, a burial team of two or three with gloves, a case register by household and water source, and stocks of single-dose doxycycline or azithromycin and of ciprofloxacin. A microscope if any exists. First failure to expect: the first deaths happen at home before anyone names cholera, and the first funeral spreads it.

District of 3,000. Needs: a treatment centre with ten or more cots, intravenous fluid and someone trained to give it, ceftriaxone, azithromycin, metronidazole, anyone able to open an abdomen, runners to the villages, and a central register. First failure to expect: antibiotics run out or stop working, and the centre itself spreads infection if chlorine and latrines fail.

Records. For each case: name, household, water source, onset, signs on arrival, fluid in, stool out, drug and dose, outcome. Count deaths per household by water source as Snow did.

Protocols

P1. Dehydration assessment by hand (WHO 2005a)

1. Look: well and alert, restless and irritable, or lethargic or unconscious?
2. Look: are the eyes normal or sunken? Ask the mother if they are more sunken than usual.
3. Offer a drink: drinks normally, eagerly, or poorly or not at all?
4. Pinch the belly skin and let go: back quickly, slowly, or very slowly?
5. Two or more signs in the middle group: **some dehydration**. Two or more in the last group: **severe**. Otherwise **none**.
6. No wrist pulse: treat as severe at once.
7. In a starved or swollen child the pinch and eyes mislead. Rely on drinking and alertness.

P2. Rehydration by weight (WHO 2005a)

None. After each loose stool: under 2 years 50 to 100 mL, 2 to 10 years 100 to 200 mL, older as much as wanted.

Some. 75 mL per kg in 4 hours.

Weight	ORS in 4 hours
under 5 kg	200 to 400 mL
5 to 7.9 kg	400 to 600 mL
8 to 10.9 kg	600 to 800 mL
11 to 15.9 kg	800 to 1,200 mL
16 to 29.9 kg	1,200 to 2,200 mL
30 kg or more	2,200 to 4,000 mL

1. Give more if wanted. Small children by spoon, often.
2. Reassess at 4 hours.
3. Puffy eyelids: stop ORS, give breast milk or water.

Severe. 100 mL per kg.

Age	First 30 mL per kg	Then 70 mL per kg
Under 12 months	1 hour	5 hours
12 months and over	30 minutes	2.5 hours

1. By drip: Ringer's lactate or normal saline. Repeat the first 30 mL per kg once if the pulse is still weak.
2. No drip: ORS by nasogastric tube, or by mouth if able, at 20 mL per kg per hour for 6 hours. Slow down if the belly swells or vomiting repeats.
3. Reassess every hour. No better at 3 hours: find a drip if one exists.
4. Adult with cholera, 50 kg, by drip: 2 litres in 30 minutes, 5 litres in all within 3 hours.

Cholera, after rehydration. 1. Measure stool in a marked bucket under a cholera cot and give back the same volume, or 200 to 250 mL per stool. 2. Expect 200 mL per kg in the first day, sometimes 350. 3. Reassess every 1 to 2 hours. Feed as soon as possible.

P3. Antibiotic for suspected cholera (GTFCC 2022, WHO 2005a)

1. Only for severe dehydration, a stool every hour in the first 4 hours, no improvement after 4 hours, pregnancy, severe malnutrition, age over 60 or known HIV.
2. Wait until vomiting stops, usually 4 to 6 hours in.
3. Adult: doxycycline 300 mg once, or azithromycin 1 g once.
4. Child under 12: doxycycline 2 to 4 mg per kg once, or azithromycin 20 mg per kg once (maximum 1 g).
5. Give it 2 hours before or 4 to 6 hours after zinc.
6. Never to well contacts.

P4. Bloody diarrhoea (WHO 2005b, MSF)

1. Assess and treat dehydration (P1, P2).
2. Ciprofloxacin twice daily for 3 days: 15 mg per kg, or by 250 mg tablet under 1 year half, 1 to 4 years one, 5 years and over two. Adults 500 mg.
3. Pregnant: ceftriaxone if available.
4. At 48 hours, if not better, switch to azithromycin 12 mg per kg on day 1, then 6 mg per kg for 4 days (adults 500 mg, then 250 mg).
5. If still no better after 48 hours, treat for amoebiasis.
6. Children: zinc 10 to 20 mg a day for 14 days.
7. Feed small meals often, with cooked green banana where available.

8. Never opium, codeine, loperamide, diphenoxylate or kaolin.
9. Watch for seizures, drowsiness, a swollen belly and little urine.

P5. Suspected typhoid

1. Suspect it in a fever climbing in steps over a week, with headache and belly pain and no other cause (Osler 1892).
2. Azithromycin 20 mg per kg a day, adult maximum 1 g, for 5 to 7 days (WHO 2012, BMJ Best Practice), or ceftriaxone 50 to 100 mg per kg a day by injection.
3. Fluids, cool sponging, soft food.
4. Examine the belly every day in weeks 2 to 4.
5. Delirium, stupor or shock: dexamethasone if available, first dose 3 mg per kg (Hoffman et al. 1984) [VERIFY: later doses].
6. After recovery: no cooking for others [VERIFY: no clearance test without a laboratory], soap after every latrine visit.

P6. Perforation and shock

1. Typhoid weeks 2 to 4: sudden severe belly pain, hard belly, vomiting, fast pulse, falling temperature. Suspect perforation.
2. Nothing by mouth.
3. Drip if possible, and antibiotics if any [VERIFY: choice not verified].
4. Send for a surgeon now. Beyond 72 hours, surgical deaths rose about six-fold.
5. Shock from any cause: cold hands, weak or absent pulse, confusion. Lay flat, give fluid by the fastest route, keep warm.

P7. Village outbreak: the first 10 cases

1. **Case 1.** Treat at once (P2). Ask where the family drinks, who cooked, who travelled, who died.
2. **Same day.** Open a register: name, household, water source, date, outcome.
3. **Same day.** Chlorinate drinking water in every household within 100 to 250 m of the case, all visited within 24 hours.
4. **Same day.** Set up a treatment area downhill and at least 30 m from water (THRIVING library, HY-04), with cots, buckets, and 0.05% and 0.2% chlorine.
5. **Days 1 to 2.** Map cases against water sources. If they cluster at one source, close it.
6. **Days 1 to 2.** Hand-washing points with soap or 0.05% chlorine at latrines, the treatment area and every case household.
7. **Day 2.** Latrines away from water. Patients' stool into a pit with 2% chlorine.
8. **Any death.** The burial team prepares the body. No family washing, no funeral meal.
9. **Cases 5 to 10.** Train helpers to mix ORS and assess dehydration. Send runners to neighbours and the district.
10. **Every day.** Count cases and deaths. Case fatality above 1% means patients come too late or get too little fluid.

P8. Chlorine solutions (MSF Annexe 15, HY-02)

1. Drinking water: 5% bleach, 1 drop per litre clear, 2 cloudy. Wait 30 minutes. A faint chlorine smell should remain.
2. 0.2% for surfaces: 4% bleach 1 part to 19 of water, 3.5% 1 to 16, 2.6% 1 to 12.
3. Contact 15 minutes. Make fresh daily, store covered and out of sun.
4. Never mix chlorine products, or chlorine with vinegar or acid [VERIFY].

P9. Safe burial in cholera (Gunnlaugsson et al. 1998, Somalia WASH cluster 2011, MSF Annexe 15)

1. A team of two or three, gloved and aproned.
2. Wipe the body with chlorine solution (0.2% in the Somali guide, 2% in MSF).
3. Plug mouth and anus with cotton soaked in solution, and wrap in plastic.
4. Bury quickly, away from water [VERIFY: distance].
5. Family may watch, not touch. No funeral meal.
6. The team washes hands and clothes with chlorine afterwards.

Numbers to carry

1. **Under 1%**: cholera deaths in a working centre. Untreated, about half (WHO 2026, Sack 2013).
2. **75 mL per kg in 4 hours**: some dehydration (WHO 2005a).
3. **100 mL per kg**: severe dehydration, 30 then 70, over 3 hours (6 for infants) (WHO 2005a).
4. **20 mL per kg per hour for 6 hours**: tube or mouth when there is no drip (WHO 2005a).
5. **200 mL per kg**: cholera fluid on the first day, sometimes 350 (WHO 2005a).
6. **Half a level 5 mL teaspoon of salt and 6 level teaspoons of sugar per litre**: the home solution (THRIVING library, HY-03).
7. **300 mg doxycycline or 1 g azithromycin, once**: adult severe cholera (GTFCC 2022).
8. **15 mg per kg twice a day for 3 days**: ciprofloxacin for bloody diarrhoea, adults 500 mg (WHO 2005b, MSF).
9. **Weeks 2 to 3**: typhoid perforation and haemorrhage (Osler 1892).
10. **Zero**: opium, loperamide or diphenoxylate in dysentery or any child.

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