IN-13 Epidemic control without a state: 1918, Ebola, plague and the village

HEALING after the FALL, research library, IN-13

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

Findings by section

1. What this report is for, and what it is not

The library already holds the history and ethics of separation (THRIVING library, HY-07): Ragusa 1377, Eyam's arithmetic, the cordons, 1918, SARS, Ebola isolation, the Fraser rule that decides whether isolation can work at all. I do not repeat it. I take as settled from that report the three definitions (isolation of the sick, quarantine of the exposed, cordon around a place), the rule that isolation alone stops an outbreak only when the share of transmission before symptoms is less than 1 divided by R0, and the measured results from Markel's 43 cities, American Samoa, Eyam and the safe-burial programmes.

What HY-07 does not do, because it was not asked to, is answer the question a village actually faces on the morning of its first strange death: **who says so, and what happens when somebody says no.** Every measure in the historical record was ordered by somebody. In Ragusa it was a council, in Eyam a rector, in Gunnison a county physician, in Sierra Leone a paramount chief, in Mawah a district task force that spent ten days persuading a village chief and his elders. After the Fall there is no health ministry and no police, so the decision machinery is the measure. That is this report's subject, together with the operational detail the brief asks for: case definitions, counting on paper, tracing contacts, barriers for the carer, feeding the isolated, burial, messages, and ending.

Two related library documents named in my brief, OR-05 (syndromic surveillance) and NU-07 (burial and the dead), do not exist in the output folder as I write, so I have built the surveillance and burial sections from primary sources rather than cross-referring. IN-11 (cholera, typhoid, dysentery) and IN-12 (the childhood killers) do exist and I cite them rather than duplicating their dosing and isolation periods.

Where I disagree with HY-07. That report treats consent as a precondition for quarantine, which is right, and then files the question of who decides under a future GOVERNING volume. I think that is a mistake for a medical book. The record shows that the decision procedure is not a separate political matter but the main determinant of whether the measure produces any health benefit at all. Mawah, West Point and Womey differ in their outcomes mostly because of how the decision was taken, not what was decided. I also read Eyam more harshly than HY-07 does: see section 5.

2. Who decided, in every case where somebody did

Strip the historical cases down to their authority structure and five patterns appear. None of them is a state in the modern sense, and three are available to a village of 300.

Case	Who decided	Source of legitimacy	Enforcement	What it cost
Ragusa 1377, Florence 1630	Standing council, then a permanent health magistracy	Existing civic office, pre-existing	Courts, fines, imprisonment, paid guards	Florence's board heard 566 cases in ten months and gaoled about 60% of offenders (THRIVING library, HY-07)
Eyam 1665 to 1666	Two clergymen, Mompesson and Stanley, proposing at a meeting	Religious office plus a neighbouring earl who paid for food	None. Voluntary, and breached	257 of 689 dead, about 37% (Whittles and Didelot 2016, via THRIVING library, HY-07)
Gunnison 1918	The county physician, Dr F. P. Hanson, with city, county and state officials in rough agreement	Public health office in a town that agreed with him	Barricades, lanterns, fines and gaol for a handful of violators	Four months of closure. Essentially no cases until reopening (Markel et al 2006, Colorado Virtual Library)
Sierra Leone 2014 to 2015	National Council of Paramount Chiefs wrote a template bye-law, each chiefdom adopted it	Customary chieftaincy, newly authorised to enforce health rules	Fines of Le 500,000, later six months' gaol, local courts	Burial gatherings continued anyway in some districts. A paramount chief fined for his own nephew's unreported death (ReliefWeb account, Anadolu, Naharnet)
Liberia 2014, Mawah and Lofa	A district Ebola task force that co-opted the paramount chief onto itself, then negotiated	Borrowed authority plus delivered goods	Checkpoint on one road, two approved canoe pilots, other canoes chained	22 cases and 19 deaths before the measure. No cases in the following seven weeks (CDC 2015, MMWR 64(7))

The sixth pattern, the one a village should study hardest, is Monrovia in September 2014, where there was no authority at all and communities improvised one. Abramowitz and colleagues (2015) ran fifteen focus groups with 386 community leaders across Monrovia and Montserrado County and recorded a four-tier structure that the communities had built themselves:

1. **Exclusion.** Keep out strangers, ban overnight visitors, require a 21-day wait before a newcomer is accepted.
2. **A community task force.** Enforces the exclusion, holds and distributes whatever quarantine resources exist.
3. **Block watch teams.** Go house to house, check on the sick, refer cases.
4. **Households.** Monitor their own members and isolate sick relatives.

That is a complete epidemic bureaucracy built from nothing, and it is directly transferable. The authors are emphatic about what it cost and refuse to romanticise it: these communities, they write, were not empowered but desperate and

often abandoned, and they describe the situation as medical statelessness. The costs they list are specific. Men took the task force, block watch and transport roles, which raised fears of youth militarisation, with West Point and Sierra Leone cited. Women took domestic surveillance and home care, which put them at the highest exposure. Children placed under 21-day community quarantine after their parents were removed often had nobody to care for them and died. Clinic closures caused deaths from ordinary illness.

3. Mawah, Bong County, Liberia: the one case documented step by step

If the book carries a single worked example of a village deciding and enforcing an epidemic measure without a functioning state, it should be Mawah, because the CDC wrote it up in detail (CDC 2015, MMWR 64(7):179-182). About 800 residents. Fishing in the St Paul River, rice fields on the far bank.

Course. A 22-year-old source patient visited on 31 August 2014 and died at Bong Mine Town on 4 September. A Mawah resident who had contact with him fell ill on 9 September, tested positive and died. The village quarantined six households of contacts itself, 9 to 16 September. Six more people fell ill and died between 17 and 20 September. From about 20 September the Fuamah District Ebola Task Force began meeting the village chief and elders. On 30 September the county asked for technical help, and on 1 October a county team with the Task Force and CDC found about two dozen symptomatic residents in the village. Community quarantine began on 1 October. The clinic reopened on 11 October. Food arrived on 12 October. The quarantine was extended ten days as a precaution and ended on 31 October. Total 22 cases (13 confirmed, 9 probable) from 9 September to 2 October, 19 of them fatal, 160 contacts identified, and no new cases from 3 October to 21 November.

How the decision was taken. The chair of the Task Force, a local physician, held repeated meetings with the chief and elders explaining what Ebola is and how it spreads. The paramount chief, the ranking traditional leader, was brought onto the Task Force rather than being issued with an order. Only then was a 21-day quarantine proposed.

What the leaders objected to, and what they got. Two objections, both material. Closing the markets and the river crossing would cut the village off from its fishing grounds and its rice fields. And the village clinic had recently closed. Both were answered before the measure began:

- The county paid a nurse for two days a week and an NGO supplied three support staff. The nurse had a non-contact thermometer and explicit instructions not to treat suspected Ebola but to arrange ambulance transport.
- The World Food Programme delivered a 45-day ration of rice, maize, beans and lentils, and helped the village leaders distribute it.
- Task Force members visited at least twice weekly for psychosocial support, concentrating on bereaved families, survivors and households with relatives in treatment.
- The river crossing was regulated rather than banned: open each morning for farmers, closed at midday, open again in the evening, with hand hygiene supplies at the landing. Two approved canoe pilots did all crossings and the other canoes were chained to trees. The pilots were instructed to refuse anyone symptomatic and any non-resident.

The measures themselves were four: residents not to leave, enforced at a checkpoint on the single access road, non-residents not to enter at the same checkpoint, river crossings regulated, and two markets closed.

What the authors claim and do not claim. They explicitly say no causal conclusion can be drawn, because symptomatic patients were removed to a treatment unit in Monrovia on 1 and 2 October at the same moment the quarantine began. They also note that the village may have accepted the measure only after watching Ebola kill nineteen of its people. Their stated lessons are worth quoting in substance: leaders must first be convinced the disease is real. A trusted local liaison who has both medical knowledge and cultural standing is what bridges the two sides. Traditional leaders should be formally included in planning and given the chance to object. Basic needs must be met during the quarantine. Isolation of the sick plus contact tracing remain essential whatever is decided about quarantine.

My reading [VERIFY]. The causal claim is weak but the procedural lesson is strong and is the one the book should carry. The sequence was: explain, co-opt the existing leader, propose, listen to objections, meet them in material goods, then start. It took about ten days of talking for a 21-day measure. A village after the Fall should budget the same ratio.

The counter-example in the same country, five weeks earlier. On 20 August 2014 Liberia sealed West Point in Monrovia, about 70,000 people, with no food plan announced and no consultation. Security forces killed a boy. The cordon was lifted after 10 of the intended 21 days (THRIVING library, HY-07). Same disease, same country, same month. The difference was the procedure.

4. The 1918 experiments read operationally

HY-07 reports the Markel and McLeod results. Three operational points need adding.

Timing is worth about a fifth of the deaths, and duration is worth as much again. Hatchett, Mecher and Lipsitch (2007) coded 19 classes of intervention in 17 cities over the 16 weeks from 8 September to 28 December 1918. Cities with four or more measures in place before their cumulative excess mortality reached 20 per 100,000 had a median peak weekly excess death rate of 65 per 100,000 against 146 for cities with three or fewer, and median total excess deaths of 405 per 100,000 against 551 (P = 0.03). Philadelphia peaked at 257 per 100,000 weekly and ended at 719 cumulative. St Louis peaked at 31 while its measures held and ended at 347. The two cities' first cases were two days apart in the paper's own dating (17 September and 5 October) but their responses were 14 days apart, which the authors reckon at three to five doubling times.

The rebound is real and quantified. This is the finding a village most needs and the one most often left out. In Hatchett's data, first-wave peaks ran from 31 to 257 per 100,000 and second-wave peaks from 14 to 80. **Cities with lower first peaks had higher second peaks (Spearman rho = -0.53, P = 0.03), and their second waves came 6 to 8 weeks after the first peak against 10 to 14 weeks for the high-peak cities (rho = -0.84, P < 0.0001).** Most 1918 measures lasted only 2 to 8 weeks and few cities held them longer than 6. The authors conclude that in a severe pandemic the measures would have to last longer than 1918 managed. Protective measures against a high-theta respiratory disease buy time and flatten the first wave. They do not prevent the epidemic. A village that does not understand this will lift its measures, see the disease return, and conclude the measures never worked.

Gunnison worked and then stopped working on schedule. Dr F. P. Hanson, the Gunnison County physician, put barricades with lanterns and warning signs on the main roads, closed schools, churches and public institutions, and declared what the town called a quarantine against all the world. Residents could leave. Nobody could enter without first spending 48 hours, later five days, in quarantine. Rail passengers who stepped off were held. Two men in a car from Nebraska who tried to drive round the barricades were arrested and gaoled, and a man from Pitkin was fined. Schools reopened about 20 January 1919 and the town reopened to outsiders on 5 February 1919. In mid-March at least 100 cases appeared and five children died of pneumonia (Markel et al 2006, Colorado Virtual Library, UCLA, 9News, all secondary). Markel and colleagues chose Gunnison as one of six escape communities (with Yerba Buena Island, Princeton, the Western Pennsylvania Institution for the Blind, the Trudeau Sanatorium and Fletcher, Vermont, population 737) and were careful about causation, saying the case is strongest for Yerba Buena and only possibly for Gunnison, and that these were the exception rather than the rule. Their operational conclusion is the usable one: protective sequestration works best when it starts early, is designed to win compliance, and continues as long as the area is at risk. They also report that they could find **no reliable 1918 data showing that face masks protected the wearer.**

Alaska is the control group nobody cites. The Seward Peninsula villages show both halves. Quarantine at the port of Nome held passengers of the S.S. Victoria for five days and fumigated the mail, and the gap was the crew: men unloading the mail, not yet knowing they were ill, infected the mail carriers, who took influenza across western Alaska on the winter trails. Mountain Village quarantined itself early and the flu never arrived. Shishmaref put armed guards

on the trails into the village and stopped the spread up the coast. At Mary's Igloo the quarantine was breached and the leaders then quarantined the half of the village that had been in contact, and that half lost many people. Brevig Mission lost 72 of about 80 residents in under a week (Senior Voice Alaska 2015, BioWorld, all secondary and partly inconsistent on tolls). Survivors were too weak to hunt and more died of starvation in the spring.

Two lessons. **Fumigating objects while letting people through is theatre**, and it is the single commonest error in the whole record. And **a village-scale cordon is the measure with the widest outcome spread in the historical record**: total success at Mountain Village and Shishmaref, total failure a day's travel away.

5. Eyam, read as an operational decision

Patrick Wallis (2006, *History Workshop Journal* 61(1):31-56, abstract and working paper only) argues that the heroic Eyam story is largely a fiction, a romantic tragedy assembled on thin evidence by poets, writers and local historians in the late eighteenth and early nineteenth centuries, not by doctors, and that the story was reshaped repeatedly to suit changing ideas of social order, family duty and communal responsibility. The village's plague story is now its tourist economy.

The hard numbers are in HY-07 and I will not repeat them beyond the two that bear on the decision: **37% of the analysed population died**, and **sharing a house with a case was roughly 50 to 100 times more dangerous than sharing a village with one.** HY-07 concludes that Eyam is not evidence that village self-quarantine saves the village. I go further. Eyam is the best-documented example of **the failure mode a village cordon produces by design**: it holds the well and the sick inside the same houses for sixteen months and measures nothing about the neighbours it was meant to protect. Nobody has ever reconstructed mortality in the surrounding parishes, so the benefit side of the ledger is literally empty while the cost side reads 257 graves.

What Eyam did get right is the part the legend ignores: **the Earl of Devonshire sent food to the boundary**, and goods changed hands at a marked stone with coins in vinegar. A self-imposed cordon without an outside food supply is a siege. Mompesson sent his own children away, which tells you what he thought the measure did for the people inside it.

6. The cost column: Marseille 1720, the armed cordon, and the shut-up house

The brief asks what each measure cost in food, work and trust. Three cases give the price.

Marseille 1720. The *Grand Saint-Antoine* avoided its quarantine to reach the Beaucaire fair. Marseille lost somewhere between 30,000 and 50,000 of about 90,000 people, with estimates for south-eastern France running from 76,000 to over 100,000, and about 1,000 deaths a day at the peak (Wikipedia and Ermus, *Arcadia*, both secondary and mutually inconsistent). On 31 July 1720 the Parlement of Aix forbade anyone from Marseille to leave and made communication between the city and the rest of Provence punishable by death. The *mur de la peste* across the Plateau de Vaucluse was dry stone, about 2 m high and 70 cm thick, with guard posts. It did not hold: the plague reached Aix, Toulon and Arles before burning out in 1722. Nicolas Roze, a shipowner made commissioner for one quarter, built gallows against looters, dug five mass graves, turned a rope-works into a hospital, organised food distribution, and on 16 September 1720 led 150 volunteers and prisoners to clear 1,200 corpses from one square. **The measures that are remembered as working there were corpse removal and food distribution, not the wall.**

The armed cordon becomes an army. HY-07 documents the 1821 Pyrenean line that became the 1823 invasion of Spain. The modern equivalent is quantified: during the tenth Ebola outbreak in the Democratic Republic of the Congo, from August 2018 to June 2020, Insecurity Insight recorded **483 attacks, including 49 arson attacks on health facilities, 27 health workers abducted and 25 health workers killed.** MSF's Ebola treatment centre at Katwa, holding 602 patients, was burned on 24 February 2019, and the Butembo centre three days later with 50 to 57 patients inside, forcing both to close. Dr Richard Mouzoko of WHO was killed in a Butembo hospital on 19 April 2019. MSF attributed the climate to political and economic grievance and an overly militarised response.

Shutting up houses is the measure that kills the family to protect the street. London's orders of 1 July 1665 required examiners, watchmen and searchers in every parish and two watchmen per infected house, one by day and one by night, to stop anyone entering or leaving, locking the door and taking the key when sent on errands. Deaths in London rose from 267 in the week before the orders to 1,843 in the last week of July (History Learning Site, secondary). Defoe, writing in 1722 and not a witness, called it hard and cruel, said many died in confinement who would have lived if separated from the sick, and reported eighteen or twenty watchmen killed or left for dead, a figure nobody has confirmed. The measure survived for a century because it looks like action. On the Eyam arithmetic it is the most lethal thing a village can do.

Harm by category, with the record attached. London's Common Council in 1665 also ordered all dogs and cats killed, Defoe's figure being 40,000 dogs and five times as many cats. The animals were rat predators. The modern Madagascar work makes the mechanism explicit: killing rodents without controlling their fleas can disperse infected fleas and makes things worse, and the combined rodent-and-flea programme, run by trained community agents with bait stations indoors and live traps outdoors, was what reduced human plague incidence for at least two years afterwards (Rahelinirina et al, via PMC and Emory summary). And the oldest harm of all is scapegoating: in 1348 and 1349, pogroms moved from Toulon through Savoy into the German lands ahead of the plague itself, Basel's massacre preceding the arrival of the disease in the city, and about 2,000 people burned at Strasbourg on 14 February 1349, five days after a guild revolt, with the council dividing the victims' cash among the working men. Jews in thirty Alsatian communities were attacked. Frank Snowden puts the total at over two hundred pogroms in that outbreak.

7. The first ten cases: a case definition a village can apply

Formal outbreak practice is: agree a case definition early, specifying person, time and place with clinical criteria, classify as suspected, probable or confirmed, and log every change to the definition with its reason (WHO Outbreak Toolkit). A village has no laboratory, so it has suspected and probable only, and its definition must be syndromic.

The usable models come from community-based surveillance, which is designed for volunteers who cannot read a thermometer. The IFRC global community definitions list and the community-based surveillance literature give definitions in this form (Conflict and Health 2024 table, IFRC 2021):

Village case definition	What it points at	Alert threshold
Three or more loose or liquid stools in 24 hours	Cholera and the watery diarrhoeas	5 reports in 7 days within a day's walk
Fever with rash, often with runny nose, tiredness or headache	Measles, chickenpox	1 report
Three or more people in one village area suddenly ill or dead with the same signs in the past two weeks	Anything	1 report

To that I would add, from the record rather than from a guideline: **fever with bleeding from gums, nose or anywhere else**, one report, **cough with blood-streaked sputum and a death within three days**, one report, and **any death in a person who was well a week ago**, one report.

The fever trap. The most important single finding in the household literature undercuts every fever-based definition. Reichler and colleagues (2018), following 838 household contacts of 150 first-in-household Ebola cases in Freetown from December 2014 to April 2015, found that **only 75% of index cases reported fever**, that all those without fever had other symptoms (median four), and that **41% of all secondary cases came from an index case with no reported fever.** Index cases without reported fever were three times as likely to die in the house (27% against 9%), and among those who died in the house the attack rate among contacts was 37% with no reported fever against 12% with

fever (P = 0.02). The authors' recommendation is to separate and refer any household member with any symptoms of the disease even without fever. Sierra Leone's roadblock fever checks and building-entrance fever screens are the probable reason fever was so heavily weighted in people's minds, which is an unusually clean example of a measure with near-zero direct yield doing indirect harm by teaching the wrong rule.

Counting on paper. A line list is one row per person and one column per fact: name, house, age, date of first symptom, main symptoms, date isolated, household members, visitors in the last week, outcome, date of outcome. The epidemic curve is a bar for each day or week with one mark per case stacked in it, plotted by date of symptom onset where known. The shape tells you whether you have a point source, which spikes and falls within one incubation period, or continuous transmission, which does not (WHO Outbreak Toolkit, standard field epidemiology). A village of 300 can keep both in one exercise book. The dates are the whole value: without a date of onset you cannot tell a new chain from a contact of an old one, and you cannot tell whether the epidemic is turning.

8. Contact tracing on paper: what it yields and what it costs

The 2014 to 2015 West African record is the only large body of data on tracing done by hand, on paper, by people recruited locally, and it is sobering.

Workload. In Western Area, Sierra Leone, from June 2014 to August 2015, 3,838 confirmed cases generated 32,706 listed contacts, a mean of **8.5 contacts per case**, with 23 per case in urban settings against 11 in rural ones. The monthly mean ran between 10 and 19 for most of the epidemic, then jumped to 61 in June 2015 and 231 in July 2015 when area-wide quarantine was imposed, which is what happens to a tracing system when a blanket measure replaces targeted work (Frontiers in Public Health 2016, 4:130). Reichler's Freetown households had a **median of five contacts per index case** by the stricter definition of people who slept in the same dwelling.

Yield and completeness. In the same Western Area data, only **22.1% of confirmed cases were already listed as contacts when they fell ill**, and only 49.0% of listed contacts could be linked back to a source case. In Kenema district, from 27 April to 4 September 2014, 261 probable and confirmed cases generated 2,525 listed contacts, of whom **89% completed the 21-day monitoring period**, but only **44% of cases had any contacts registered at all** and only **6% of cases had previously been identified as contacts** (Frontiers/PMC4916168, via search summary). The authors' conclusion is that incompleteness of tracing allowed considerable unmonitored transmission in the early months.

What the tracers themselves said. Of ten key informants in Western Area, nine named timely identification of contacts who became cases as their main success. Four estimated that under 10% of the contacts they monitored developed symptoms. Eight said community quarantine made their work easier. Their reported obstacles were stigma directed at tracers (6 of 10), wrong or withheld contact information (5 of 10), and late or irregular food and water for the people they were monitoring (4 of 10). Their recommendations are the design brief for a village system: **select tracers from the local community through a transparent process, involve community leaders in listing the contacts, train and retrain, start the register early, supply the tracers, and feed the quarantined.**

The honest arithmetic for a village of 300. At 8.5 contacts per case and ten cases, a village is monitoring 85 people, about 28% of itself. At five contacts per case it is monitoring 50, about 17%. HY-07 sets the collapse threshold at roughly 10% of the village quarantined at once. I think that is right and that the implication is unavoidable: **a village of 300 can trace contacts for the first five or six cases and not beyond.** After that the labour must shift entirely to isolating the obviously sick and burying safely.

9. The care site: what a village-run isolation facility achieved, and when it backfired

HY-07 gives the Pronyk and Kucharski numbers. Three things need adding for an operational playbook.

It improves reporting as much as it improves transmission. A difference-in-differences analysis found that the

Sierra Leonean Community Care Centres **roughly tripled the increase in reported cases** in the sections that had them, relative to those that did not (Dube and colleagues, working paper, abstract and summary only). Read naively that looks like harm. Read correctly it is the point: a care site that people trust converts hidden deaths into counted cases. The same group's randomised trial is the strongest evidence in this whole report for the proposition that trust is an intervention. Christensen, Dube, Haushofer, Siddiqi and Voors randomised 254 Sierra Leonean government clinics two years before the epidemic, 85 to community monitoring, 85 to non-financial staff awards and 84 to control. During the epidemic the interventions **raised reported Ebola cases by 62%**, and community monitoring **significantly reduced Ebola deaths**. Before the epidemic, community monitoring had cut under-five mortality by 38%. The mechanism the authors propose is that both arms raised the perceived quality of care, so people came forward. This is an A-grade result and it says that the work of making a village dispensary trusted must be done years before the epidemic.

Who staffs it is a political question and it will be contested. The Ebola Response Anthropology Platform's evaluation of the care centres in spring 2015 found residents complaining that the well-paid centre jobs went to friends and family of local paramount chiefs, local health authorities questioning the medical competence of centre staff, and primary health unit staff resenting unequal pay. A second evaluation, focused on quality of care, concluded the staffing model was acceptable and feasible. Both found that residents highly valued the medical care, **the food given to patients**, and the skill and attention of the staff. The disagreement is instructive: the same facility was a success on clinical criteria and a grievance on fairness criteria. A village of 300 cannot afford the grievance version, because in a village of 300 the favoured family and the resentful family share a well.

The Kucharski threshold is the safety case and it is about triage, not about beds. HY-07 states it and I endorse it without qualification: below roughly 50 to 60% transmission reduction inside the facility, combined with more than about 10% risk that a negative patient is infected while waiting, no number of beds stops case growth. Half the fevers in any village will be malaria or typhoid. **Separating the probable from the possible at the door is the entire difference between a care site and a transmission site.**

10. Protecting the carer: what the evidence actually supports

This is the section where the romance of the hospital does the most damage, because the image in everyone's head is the yellow suit, and the yellow suit is not available.

The risk is real and large. WHO's preliminary report of 21 May 2015 analysed 815 confirmed and probable health worker cases in Guinea, Liberia and Sierra Leone from 1 January 2014 to 31 March 2015, using a broad definition that includes drivers, cleaners, burial teams and community workers. Two thirds of those with known outcome died, and depending on their role they were **21 to 32 times more likely to be infected than other adults.** MSF, citing the same report, gives 418 dead of 815, 217 recovered, 181 unknown. For household carers, Reichler found that **24% of household care providers developed Ebola, more than three times the rate among contacts who did not provide care**, and this six months into a heavily publicised education campaign.

What protected people was behaviour, not equipment. In Reichler's cohort, **only 14% of care providers used any form of barrier protection at all**, including plastic bags over the hands, so the study cannot say what gloves are worth. What it can say, and this is the most useful finding in the household literature, is that the contacts who **stayed at least 1 metre away, stopped eating meals with the patient, avoided touching the patient, and stopped sleeping with or near them** had significantly lower attack rates. Risk rose with providing care, physical contact, contact with body fluids, contact with the patient's clothing or bed linen, sleeping in the same room, and being a first-degree relative. Index case death in the house carried a 3.5-fold increase. A piped drinking water source was protective. The authors recommend designating one care provider while everyone else avoids the case, which is exactly the UNICEF and WHO household rule (THRIVING library, HY-07).

Masks: what the record will bear. The 1918 evidence is negative for compulsory community masking. Kellogg's

1919 report for the California State Board of Health concluded that mask ordinances applied forcibly to entire communities did not reduce cases or deaths, comparing Stockton, which mandated masks, with Boston, which did not. His verdict was that the case against the mask as a measure of compulsory application appears complete. Vaughn in 1921 wrote that efficacy was still open to question and that the mask as used was a failure. Markel's team, looking for mask data in 1918, found none that showed protection of the wearer. Modern commentators attribute the failure to behaviour rather than to the fabric: masks worn outdoors where risk was lowest, removed indoors where it was highest, worn until filthy, and poorly complied with (Health Affairs 2020, secondary).

The laboratory evidence on household fabrics is better than the field evidence and should be read as a ceiling, not a promise. Davies and colleagues (2013) tested household materials against a bacterial aerosol and a bacteriophage at 30 L/min: a tea towel filtered about 83% of the bacterial marker and 72% of the viral one, two layers of tea towel about 97% bacterial, a cotton T-shirt about 69% and 51%, a pillowcase about 61% and 57%, a surgical mask about 96% and 90%. In their second experiment, volunteers coughing into a sampling chamber wearing home-sewn cotton masks expelled significantly fewer organisms than unmasked, but the surgical mask was three times better at blocking. Their own conclusion was that homemade masks are a last resort, better than nothing. Against that, MacIntyre and colleagues (2015), the only cluster randomised trial, assigned 1,607 health workers in 14 Vietnamese hospitals to medical masks, two-layer cotton cloth masks or usual practice for four weeks. Particle penetration was almost 97% for the cloth masks against 44% for medical masks, and influenza-like illness was significantly higher in the cloth arm (RR 13.00, 95% CI 1.69 to 100.07, a very imprecise estimate). The control arm was usual practice, which included mask use, so there was no unmasked comparison and the result cannot distinguish cloth harm from medical mask benefit. The authors proposed moisture retention, reuse and poor filtration as mechanisms and recommended against cloth masks for health workers in high-risk settings.

My reading [VERIFY]. The convergence of these findings is that a cloth mask worn continuously by a carer in a small room, becoming damp and reused without boiling, may be worse than none, while a clean dry cloth over the mouth and nose of a coughing patient, changed and boiled daily, is cheap and plausible. **Mask the patient, not the village.** That is the opposite of what both 1918 and 2020 mostly did.

Chlorine. The Ebola standard, consistent across WHO and CDC training material, is **0.05% chlorine for living tissue and chlorine-sensitive items** (hands, skin, linen, thermometers, eating utensils) and **0.5% chlorine for everything non-living** (corpses, surfaces, vomit, diarrhoea, blood, gloved hands). In units, 0.5% is 5,000 mg/L and 0.05% is 500 mg/L. Linen can be soaked in 0.05% for about 30 minutes after washing and rinsing. From a 5% household bleach that is about 1 part in 10 for the strong solution and 1 part in 100 for the weak, and from 8% bleach about 1 in 16 and 1 in 160 [VERIFY, this dilution arithmetic is mine from the stated concentrations, and bleach strength varies by product and degrades with time, pH and temperature]. Two cautions carry directly: chlorine is much less effective on a surface soiled with vomit or faeces, so clean first and disinfect second, and **WHO advises against spraying or fogging rooms**, which it calls potentially dangerous with no proven benefit. Chlorine never replaces soap on hands.

Gowns, gloves and the act of taking them off. Verbeek and colleagues' Cochrane review (CD011621) included 24 studies, 14 of them randomised, with over 2,200 participants, and rated the certainty of all of it **low to very low** because of small studies, high or unclear risk of bias, and reliance on simulation. What signal there is suggests that more body coverage protects better but is complied with worse, and that following a structured removal procedure reduces contamination and improves compliance. The operational translation for a village is that **the sequence of taking the covering off matters at least as much as what the covering is made of**, and that a procedure practised in advance with clean water and a helper calling the steps is worth more than better cloth.

Survivors as carers. This is standing advice in the library (THRIVING library, HY-07) and it is sound but should be stated at its true strength. No reinfection of an Ebola survivor has been documented, which is an absence rather than a proof. Antibody persistence is good: a Guinean cohort found 95% of survivors with both antibodies and a T-cell response with no significant decline beyond three years, and antibodies detectable to 60 months in most, though

roughly a quarter had none. Survivors of the 1976 Zaire outbreak still had neutralising antibodies 40 years later in a sample of 14. In October 2014 the UN trained 20 Ebola survivors to staff interim care centres in Liberia with 30 more identified, and survivors were hired as nursing assistants. No study has compared infection rates of survivor carers with other carers. **Grade C, strongly plausible, never tested.**

11. Feeding the isolated: the arithmetic, and what happens when it fails

Every account in this report that ends badly has hunger in it, and every account that ends well has a food delivery in it. Eyam had the Earl of Devonshire's food at the boundary. Florence's health board fed the poor. Mawah got a 45-day ration before the checkpoint went up. West Point got nothing and collapsed in ten days.

The failure is documented in detail for Sierra Leone in late 2014. Aid agencies reported thousands of people breaking quarantine to find food because deliveries were not reaching them. The Disasters Emergency Committee said the government had a system to feed the quarantined but it was not working and people were going hungry. Christian Aid's representative described the problem as missed nooks and crannies, and argued that the failures pushed people who should have stayed home into markets, which is an aid worker's assessment and not a measured result. Movement restrictions cut the supply chain in turn: the quarantine of Kenema stopped food trucks moving. In Western Area, four of ten contact tracers named late or irregular food and water for the people they monitored as a main obstacle to their work.

The arithmetic. The humanitarian planning figures are **2,100 kcal per person per day** for a general ration, with 10 to 12% of energy from protein and 17% from fat, plus 300 kcal extra per day in pregnancy and 500 extra when breastfeeding, and **15 litres of water per person per day**, which Sphere treats as a planning figure rather than a maximum and which can drop to 7.5 litres briefly in acute scarcity (Sphere Handbook, via secondary summaries). For a village of 300 at the collapse threshold, 30 people quarantined for 21 days, that is about 63,000 kcal per day for three weeks, roughly 1.3 million kcal in total, or in rough grain terms about **380 kg of grain-equivalent** for the quarantined alone [VERIFY, my arithmetic at 3,500 kcal per kg of dry grain, which understates the vegetables and fat a real diet needs]. For the district of 3,000 HY-07 estimates about 1.5 tonnes for 150 people over three weeks, which is the same order.

The real-world distributions are consistent in magnitude. WFP's October 2014 Waterloo operation used 700 workers and 60 sites to deliver more than 800 tonnes of rice and fortified cereal to 265,000 people, intended to cover 30 days. A March 2015 UN situation report records one month's food for 100 quarantined households in Port Loko and Kambia and 142 in Western Area in a single week.

The rule that follows. A quarantine without a food plan is not a quarantine, it is a slow riot. The decision to isolate and the decision to feed are the same decision and must be taken in the same conversation, before anything is announced.

12. Burial: where it matters, where it does not, and what the family must be given

HY-07 carries the Tiffany estimate (2.58 secondary cases per unsafe burial, 4.9 to 36.5% of the West African epidemic averted by the safe burial programme) and the rule that nobody touches, washes or kisses the body of a feared-fever death. Three additions.

Where it matters most, and where it does not matter at all. Burial transmission is decisive for viral haemorrhagic fevers. WHO's Pierre Formenty put at least 20% of new Ebola infections at the burials of Ebola patients. It matters for cholera, but through a different mechanism, and here the evidence is weaker than people assume. In Biombo, Guinea-Bissau in 1994, villages that did not disinfect bodies had a weekly attack rate after funerals **2.6 times higher** (95% CI 1.9 to 3.8) than villages that did. Eating at a funeral with a non-disinfected corpse gave an odds ratio of 14.5 and handling the body one of 36.2, but both intervals are so wide (0.9 to 786 and 2.6 to 1769) that they are signals rather than estimates. The authors' recommendations were to tell community leaders that funerals transmit,

not to serve meals at funerals, and to disinfect the bodies. In Chegutu District, Zimbabwe in 2018, a woman who prepared a body and served traditional food at the reception developed diarrhoea two days later, and a shallow well at the reception site was faecally contaminated. In Papua New Guinea in 2009 neither washing the body nor attending a funeral reached significance after adjustment, while close contact with a diarrhoea patient did. **The cholera funeral risk runs through the food and the water at the gathering at least as much as through the corpse**, and a village that bans touching the body while serving a communal meal from a contaminated well has done the wrong half. For influenza, measles, typhoid and most of the rest, **the body is not the problem and burial restrictions buy nothing while costing a great deal of trust.** That is the mirror of the mistake HY-07 identifies in the other direction.

What a safe burial actually consists of. WHO's protocol of 30 October 2014, in 12 steps, is the most complete lay-executable procedure in the humanitarian record. Its structure, as summarised in the contemporary reporting: a team of four in full protection plus a sprayer with chlorine solution, and, crucially, **three people who do not suit up at all** - a technical supervisor, a family liaison and a religious representative. Equipment: an impermeable body bag with at least four handles, hand sanitiser, chlorine solution, soap and water, disposable and heavy-duty gloves, a coverall, rubber boots and separate bags for reusable and disposable items. Before anyone suits up, the team offers condolences and obtains the family representative's approval. The family decides what happens to the deceased's belongings, may photograph the procedure, states its religious preferences, may place religious items with the body, and may substitute an act such as sprinkling water for touching. The family may carry the coffin wearing household gloves and ride with it. At the grave they may pray, speak and close the grave themselves, and then wash their hands with disinfectant.

The design principle, which is what a village needs. Over half of that protocol is social, not microbiological. The non-suited liaison, the religious representative, the family's right to choose the belongings and the grave, the retained ritual: these are what made the burials happen at all, and HY-07's rule that forced burial creates hidden burials is correct. Mark it: **the biologically safe burial that the family rejects produces a secret unsafe burial, so a slightly less safe burial the family accepts is the safer policy.**

13. Messages that are believed, and what happens when they are not

What people knew and still got wrong. A national survey of 1,413 randomly selected respondents across nine of Sierra Leone's fourteen districts in August 2014 found awareness and preventive behaviour widespread but with large specific errors. About 60% could name fever, diarrhoea and vomiting unprompted. 87% knew that avoiding infected body fluids prevented infection and 85% knew the same about contact with a corpse. But **41% believed that washing with salt and hot water prevented infection**, and **95% expressed at least one discriminatory attitude towards survivors.** 41% had received their information through religious leaders. Radio was the most preferred channel, and health professionals and government were named the most trusted sources (BMJ Global Health 2017, EID 24(2)).

Two lessons. A village will believe several true things and one dangerous false thing at the same time, and the false one will be the one that offers an easy action. And **stigma against survivors is near-universal and must be attacked explicitly**, because survivors are the carers and burial team you want.

The largest community engagement programme ever run, and what it proves. Sierra Leone's Social Mobilization Action Consortium ran Community Led Ebola Action in nearly 70% of the country's communities: 2,466 community mobilisers, thousands of religious leaders, 42 radio stations, over 12,000 communities. The method was a triggering event to create urgency and local ownership, then a community-written action plan, then weekly follow-up. The action points communities chose were frequently **bye-laws of their own making, such as restricting entry to and exit from the community.** Of 63,110 cumulative action points monitored from December 2014 to September 2015, 92% were recorded as in progress (85%) or achieved (7%). The authors' honest conclusion is about feasibility, not effect: large-scale participatory engagement with real-time community-generated data on safe

behaviours, sickness and death is achievable in an emergency if it is structured, managed and resourced. **The data were collected by the mobilisers themselves, so an action point in progress means it was reported, not verified, and the study does not measure any effect on transmission.**

The two failure modes, both lethal. The first is the message that does not fit what people see. Abramowitz's leaders described hotline calls going unanswered, patients who went to treatment centres and never came back, deaths that were not reported to families, and rumours that bodies were being dissected for body parts. They also described contradictory messaging: do not touch, against touch but use plastic gloves. One leader's summary is worth carrying: people have heard the messages but do not know how to practicalise them. Only about half said they would call a health team or urge a sick relative to go to a treatment unit. Secret burials and unsupported quarantine, where a family isolates a relative without treating them, were the result.

The second is violence. On about 16 September 2014 a team of health workers, officials and journalists went to Womey in south-eastern Guinea to teach people how to avoid Ebola and **eight of them were killed** with knives and stones: the deputy administrative official, the head of the village health centre, two health officials from N'Zerekore, a pastor and three radio journalists. A local police officer reported the villagers' belief that Ebola was an invention of white people to kill black people. Eleven men were later given life sentences. The disease had never appeared in that forest region before and villagers suspected outsiders had brought it. Fast and colleagues (2015), modelling Lofa County, found the same pattern and its reversal: the response met resistance and violence first, then social mobilisation gained traction, cases were isolated faster, unsafe burials stopped and weekly cases declined. Only the model scenario that included behaviour change fitted the observed case counts at all, and expanding the treatment units alone, which happened in mid-August 2014, was insufficient.

Where coercion led. Sierra Leone's bye-laws began with fines of Le 500,000 (about US$100 to 116) for unreported deaths, for failing to report a sick relative, and in one Freetown community for shaking hands. The president suspended and fined his own uncle, a village head, for covering up secret burials, and fined a brother and an aunt. One chiefdom's speaker reported the bye-laws applied without favour, including a Le 500,000 fine for the paramount chief's own nephew's unreported death, paid before the burial team was called, and still owed when the swab came back negative, with the chiefdom secretary keeping a ledger. In Bo district the medical officer said flatly that the bye-laws were not functioning, since large burials continued. By June 2015 Port Loko's response coordinator announced that fines had not changed behaviour and violators would be gaoled for six months instead, with 1,029 people then under quarantine. **Escalation from fines to gaol is the signature of a measure that has lost consent, and in the record it never recovers it.**

The three-day lockdown as the limiting case. From 19 to 21 September 2014 Sierra Leone confined six million people to their homes while teams visited a target of 1.5 million households, reaching about 75%. The announced yields were around 130 to 150 new cases and somewhere between 90 and 250 unburied bodies, figures that vary by outlet and were given before the operation ended. During it, young people attacked a burial team near Freetown, and volunteers reported residents complaining of food shortages. **Six million people confined for three days to find roughly 150 cases** is the clearest available measure of what a blanket measure yields against a targeted one.

14. Ending measures: when, and who says so

The formal rules. For Ebola, WHO counts **42 days, two incubation periods, with no new case**, the clock starting from the second consecutive negative test or the death of the last case, followed by **90 days of enhanced surveillance.** Sierra Leone's primary transmission was declared ended on 7 November 2015 and the country then entered the 90-day period. A 2020 modelling study (Djaafara, Imai, Cori and colleagues) argues that 42 days is too short and too sensitive to under-reporting, and proposes a preliminary declaration at **63 days from the symptom onset of the last detected case**, followed by the 90 days, corresponding to under 5% probability of a flare-up in most scenarios. I have not found that WHO adopted it.

The general form of the rule is **twice the longest incubation period with no new case**, which gives 42 days for Ebola, 34 for smallpox, 42 for measles, 14 for pneumonic plague and about 10 for cholera. For a disease you cannot name, use 42.

The informal rules, from the record. Gunnison reopened schools about 20 January 1919 and the town on 5 February, and took 100 cases and five child deaths in March. Mawah extended its 21 days by ten as a precaution and ended on 31 October, with no cases for seven weeks afterwards. The 1918 cities mostly held their measures 2 to 8 weeks and almost none beyond 6, and no city had a second mortality peak while its first set of measures was still in force, but lower first peaks bought earlier and higher second peaks. Eyam's last plague burial was 1 November 1666, sixteen months after the first.

Who decides, after the Fall. From the Mawah lesson list and the Western Area tracers' recommendations, the answer that the record supports is: **the same body that decided to start, in public, on a date announced in advance, with the counting shown.** The one mechanism that must be in place before anything begins is a published end condition. HY-07's protocols say the date must be stated aloud at the start. I would make it stronger: the measure must be announced with both a date and a counting rule, so that the village can see for itself whether the condition has been met. A measure that ends because people are tired of it teaches everybody that the rules are arbitrary, and the next epidemic begins with that lesson already learned.

15. Disease-specific moves

Disease	The one thing that changes the outcome	What is nearly useless	Isolate until
Influenza and influenza-like illness	Keeping the disease out of the village entirely, early, and holding it while it is outside. Once it is in, layer several mild measures early rather than one hard one late	Masks imposed on the whole community. Fever screening at the boundary. Cordons that keep households intact and merely stop movement between them	7 days after fever ends. Expect contact quarantine to fail (theta too high)
Cholera and the watery diarrhoeas	Water, latrines, hands, and oral rehydration (THRIVING library, IN-11, HY-02, HY-03). Under 1% die in a working rehydration centre, about half untreated	Isolating people. Closing roads. Burial restrictions on their own. The chain is faecal-oral	No person-to-person quarantine. Contain stool and keep drinking. 70% clear stool by week 1, 98% by week 3
Measles	Vitamin A by age on two days, nutrition, and keeping cases away from infants and the malnourished (THRIVING library, IN-12). R0 12 to 18	Quarantine of contacts after exposure, because it is infectious 4 days before the rash. Cordons	4 days after the rash. Expect it to reach everyone susceptible

Disease	The one thing that changes the outcome	What is nearly useless	Isolate until
Plague, bubonic	Fleas and rodents together, by trained local people, indoors and out. Never rodents alone, which disperses infected fleas. Untreated case fatality about 50 to 60%	Isolating the patient from other people, which is not the route. Killing cats and dogs	No person-to-person isolation for bubonic. Flea control instead
Plague, pneumonic	The strictest isolation in the book, a mask on the patient, immediate deep burial, 7 days' watch on household contacts. Near-uniformly fatal untreated	Everything else	Through illness. 1 to 3 day incubation leaves almost no margin
A viral haemorrhagic fever	Aggressive oral rehydration, one named carer, isolation within 3 days of first symptom, safe burial the family accepts. Treat any symptoms as a case even without fever	Waiting for fever. Mass screening. Any measure that mixes the undiagnosed with the diagnosed	3 clear days after fever ends. 21 days' watch on contacts from last exposure

Evidence grades

Column 2 is what the practice claims, column 3 what the measured record shows.

Practice	Claim	Record	Grade
Negotiating a quarantine with the existing leader before announcing it	Makes it hold	Mawah: 22 cases before, none for 7 weeks after, no violence. West Point: no consultation, collapsed in 10 of 21 days with a death	**B**
Delivering food and reopening the clinic **before** the boundary goes up	Buys consent	Mawah's leaders raised exactly these two objections and both were met first. Sierra Leone's unfed quarantines were broken in thousands	**B**
Community monitoring of a dispensary, years before an epidemic	Builds the trust you will need	Randomised, 254 clinics: 62% more Ebola cases reported, significant fall in Ebola deaths, 38% fall in under-five mortality beforehand (Christensen et al)	**A**

Practice	Claim	Record	Grade
A community task force with block watches, built by the community	Finds cases when nothing else exists	Documented across 15 Monrovia communities. Effect on transmission never measured	**C**
Syndromic case definitions a lay person can apply	Lets a village count without a laboratory	IFRC and IDSR practice. Reichler: fever-based definitions miss 25% of cases and 41% of onward transmission	**B**
A paper line list with dates of onset	Tells you whether the epidemic is turning	Standard field epidemiology. Western Area could link only 49% of contacts to a source case without one kept properly	**B**
Contact tracing by locally chosen tracers	Catches cases early	8.5 contacts per case, 22.1% of cases already listed. Monitoring cut onset-to-isolation by about 1.7 days in SARS (THRIVING library, HY-07)	**B, low yield**
One named carer and everyone else keeping away	Concentrates the risk in one person who can be protected	Reichler: 24% of carers infected against under 8% of other contacts. Staying 1 m away, not eating together, not touching and not sleeping near all protected significantly	**B**
A clean dry cloth over a coughing patient's mouth and nose, boiled daily	Reduces what reaches the room	Davies: 69 to 83% filtration of a bacterial marker by household fabrics, surgical masks 3 times better at blocking a cough	**C**
Cloth masks worn continuously by carers, reused damp	Protects the carer	1918 mask ordinances: no reduction in cases or deaths (Kellogg 1919). MacIntyre: significantly more illness than medical masks, no unmasked arm	**D, possibly X when damp and reused**
Chlorine at 0.05% for skin and 0.5% for surfaces, corpses and fluids	Kills the organism	Consistent WHO and CDC standard. Ineffective on soiled surfaces unless cleaned first	**B**
Spraying or fogging rooms with disinfectant	Cleans the air	WHO: potentially dangerous, no proven disease-control benefit	**X**

Practice	Claim	Record	Grade
Fumigating goods, mail or baggage while people pass	Stops importation	Nome 1918: mail fumigated, the crew infected the carriers, the epidemic went across Alaska	**X**
A structured, practised order for removing protective coverings	Prevents self-contamination	Cochrane (Verbeek): some benefit from following a defined procedure, certainty low to very low, mostly simulation	**C**
Safe burial with a non-suited liaison, a religious representative and family choice	Gets done at all	2.58 secondary cases averted per unsafe burial avoided, 4.9 to 36.5% of the epidemic (THRIVING library, HY-07)	**B**
Disinfecting cholera corpses and banning meals at funerals	Stops funeral chains	Guinea-Bissau 1994: attack rate 2.6 times higher where bodies were not disinfected (95% CI 1.9 to 3.8)	**B**
Burial restrictions for influenza, measles, typhoid	Protects mourners	No transmission route through the body. Pure cost in trust	**X**
Announcing the end date and the counting rule at the start	Keeps the measure credible	Gunnison, Mawah, 1918 cities. No city had a second peak while measures held, and every one that reopened early got one	**B**
Fines escalating to imprisonment for breaking epidemic rules	Compels compliance	Sierra Leone: fines did not change behaviour, so six months' gaol was substituted. Burials continued regardless	**D, trending to X**
Sealing a populated district without consultation or food	Contains the outbreak	West Point: a boy killed, 10 of 21 days, abandoned	**X**
Killing cats and dogs, or rodents without their fleas	Removes the carrier	London 1665 removed the rat predators. Madagascar: killing rodents disperses infected fleas	**X**

Practice	Claim	Record	Grade
Blaming and expelling a family or a group	Removes the source	Over 200 pogroms in 1348 to 1349, several before the plague arrived. Every subsequent cordon in the same tradition	**X**
A three-day blanket lockdown of a whole population	Finds hidden cases	6 million confined for 3 days, about 150 cases found, a burial team attacked, food complaints	**D**
Fever screening at a gate or boundary	Catches carriers	90 million screened, 2 cases (THRIVING library, HY-07). Also taught Sierra Leoneans the wrong case definition	**X**

Means ledger

A. Deciding, announcing and enforcing a measure

Rung	What it can do	What it changes
Hands and knowledge	One trusted person explains the disease to whoever people already obey, repeatedly, before proposing anything	The whole difference between Mawah and West Point. Costs ten days and no materials
Hearth	A household keeps its own sick apart and tells the healer	The first case reported instead of hidden
Garden and still	A village meeting with a written rule, a named end date, a named counting rule, and a named body to lift it	Compliance becomes voluntary and survives the first argument
Village dispensary (300)	A standing committee agreed in peacetime, a food rota, a register, and a trusted liaison who has both medical standing and local standing	Mawah's conditions, reproduced. Also the Christensen effect: people come forward
District infirmary (3,000)	Villages agree a common rule set in advance, including what the district owes a quarantined village	A measure one village imposes and another ignores becomes an argument, not a measure
Pre-Fall hospital	Statutory powers, police, compensation, a legal appeal	Enforcement is available and corrodes consent when used

B. Finding and counting cases

Rung	What it can do	What it changes
Hands and knowledge	Four syndromic definitions memorised. Any three people ill alike in two weeks is an alert	Days of warning, free
Hearth	Each household reports fever, rash, bleeding or watery stool the same day	Onset-to-report falls from days to hours
Garden and still	A paper line list with dates of onset, kept by one literate person. A weekly bar chart	You can tell a contact of an old case from a new chain, which is the whole basis of every later decision
Village dispensary (300)	Block watch teams walking every house weekly, a contact register, a named tracer per quarter of the village	Western Area's tracers found 22.1% of cases already listed. A village of 300 should beat that
District infirmary (3,000)	Village registers collected weekly. A microscope to separate malaria from the thing you fear	Triage at the care site becomes possible, which is the Kucharski safety case
Pre-Fall hospital	Laboratory confirmation within hours, digital contact databases	Confirms rather than guesses. The counting is no better than a careful exercise book

C. Protecting the carer and the burial team

Rung	What it can do	What it changes
Hands and knowledge	One named carer. Everyone else stays 1 m away, stops eating with the patient, stops touching, stops sleeping near	The only carer protections with a measured effect in the household record
Hearth	Soap at the door. Patient's own plate, cup, towel, bedding, boiled separately. A clean dry cloth on the coughing patient's face, boiled daily. Bucket for stool and vomit	Reaches the documented household standard with nothing bought
Garden and still	Lye soap in quantity. Oiled cloth or leather over the hands, burned or boiled after. Long sleeves, boots or foot rags. A practised order for taking it all off, called aloud by a second person	The Cochrane signal: the removal procedure is worth as much as the material
Village dispensary (300)	A known-strength bleach kept for 0.5% surface solution and 0.05% skin solution. A survivor carer where one exists. A rota of at least six so nobody does it exhausted	The 21 to 32-fold occupational risk is what a rota and a procedure are fighting

Rung	What it can do	What it changes
District infirmary (3,000)	Clean and dirty zones with one door each, a handwashing station between, gowns boiled between patients, a burial ground with a register	Carers stop being the second generation of cases
Pre-Fall hospital	Impermeable suits, respirators, negative pressure, post-exposure prophylaxis	Better, and still gave two thirds mortality to 815 infected health workers in West Africa

D. Feeding and supplying the isolated

Rung	What it can do	What it changes
Hands and knowledge	Neighbours leave food at the threshold and step back	The measure holds for a few days
Hearth	A named household responsible for each isolated household, daily, with water and fuel	Daily contact also becomes the daily symptom check
Garden and still	A stored reserve set aside in advance, so the ration does not depend on this season's harvest	Removes the main reason quarantines break
Village dispensary (300)	A food rota on paper with the end date on it, about 2,100 kcal and 15 litres of water per person per day	30 people for 21 days is roughly 380 kg of grain-equivalent [VERIFY, my arithmetic]
District infirmary (3,000)	A reserve for about 5% of the district for three weeks, and a rule that the district feeds a quarantined village	Mawah's 45-day ration, locally reproduced
Pre-Fall hospital	Welfare payments, delivery logistics	Nothing a village cannot approximate, which is why this rung is the one worth copying

Harm test

1. **A cordon that leaves households intact kills the households.** This is the Eyam mechanism and it is the largest single harm in the whole subject. Separate the person, not the family. Move infants, pregnant women and the frail out first.
2. **A care site without triage at the door manufactures cases.** Below about 50 to 60% transmission reduction inside, with more than about 10% chance of infecting someone waiting for a verdict, no number of beds helps. Half your fevers will be malaria.
3. **A quarantine without food breaks, and it breaks into the market.** Thousands broke quarantine in Sierra Leone for exactly this reason, and 4 of 10 tracers named it as their main obstacle. Mawah's food arrived before the checkpoint went up.
4. **Fever as the entry criterion misses a quarter of cases and 41% of onward transmission.** Teaching a village to check for fever at a boundary teaches it the wrong rule in its own homes.
5. **Masks worn damp and reused may harm the wearer.** The only randomised trial found significantly more illness in the cloth arm. Mask the patient, boil the cloth daily, and never treat a mask as a substitute for distance.

6. **Chlorine hurts people and does nothing useful when misused.** It is not for hands at 0.5%, it does not work on a surface still covered in vomit, and spraying it into an occupied room is dangerous with no proven benefit. It never replaces soap.
7. **Escalating punishment is the sign the measure has already failed.** Sierra Leone went from fines to six months' gaol because the fines had not changed behaviour, and burials continued anyway. The harm is that the authority spent is not recoverable.
8. **Blaming a household or a group is the oldest measure and it has never once worked.** Several of the 1348 to 1349 massacres happened before the plague arrived in the town.
9. **Forced burial produces secret burial.** Secret burial is the most dangerous single event in a haemorrhagic fever epidemic.
10. **A measure against a disease that does not spread that way is a pure loss.** Burial restrictions for influenza or measles, isolation instead of water treatment for cholera, rodent killing without flea control for plague.

Who must never take the risk. As carer: anyone pregnant, nursing, under 15, over 60, or chronically ill, because the carer's measured infection rate is three times everyone else's. A nursing mother and her infant should not be separated unless the disease passes in milk and there is a wet nurse. Nobody should be quarantined without food, water, fuel and a daily visit. A dehydrated patient must never be shut in alone: fluids outrank isolation every time (THRIVING library, HY-03, IN-11).

Signs it is going wrong. Cases appearing in carers rather than in the first households. Cases in people who entered the care site for something else. Deaths reported with no preceding illness, meaning households are hiding sick people. People moving at night. The quarantined hungry on day three. Tracers being insulted or avoided. Any weapon raised at a boundary. **Then stop.** Shrink to the smallest thing that still helps - isolating the clearly sick, one carer each, safe burial that families accept, clean water - re-explain in public, fix the food, and replace every instance of force with a neighbour bringing a meal.

Red flags

1. **A second generation of cases with no link to the first.** Your register is blind and the chain is wider than you know. **Do anyway:** stop tracing, put everything into isolating the obviously sick and burying safely, and warn the next village honestly.
2. **The first case in a carer.** Your barrier practice has failed, not your isolation. **Do anyway:** rebuild the removal procedure with a second person calling the steps, and rotate the carer.
3. **A hidden death discovered.** Hiding is a trust failure, not a discipline failure. **Do anyway:** do not punish that family. Say in public that the family that reports does the village a service, and feed them visibly.
4. **A quarantined household with no food on day three. Do anyway:** break the quarantine openly to feed them rather than let it collapse in anger.
5. **Any weapon raised at a boundary, or a crowd forming around a burial team or a tracer.** This is Womey and West Point in their first minutes. **Do anyway:** withdraw the team that day, send the most trusted local person back alone and unarmed, and renegotiate from the beginning.
6. **Pneumonic plague.** Fever, chest pain, blood-streaked sputum, 1 to 3 days after contact with someone the same. Near-uniformly fatal untreated. **Do anyway:** the strictest isolation available, a cloth mask on the patient, immediate deep burial, 7 days' watch on every household contact.
7. **A haemorrhagic fever with a death in the house.** 3.5-fold transmission risk and the body is the most dangerous object in the village. **Do anyway:** aggressive oral rehydration for the living, one carer, no touching the body, burial the same day with the family present at a stated distance.
8. **The market must close at harvest.** The measure that will cost the most and be obeyed the least. **Do anyway:** take the smaller measures first, run the market outdoors and spaced, and only close if the village can eat for two weeks without it.
9. **Measures ending because people are tired, not because the count says so. Do anyway:** hold to the

announced counting rule if you can, and if you cannot, say out loud that you are ending it early and why, so that the next rule still means something.

Honest comfort. The loneliness is the cruelty, not the room. Let one person stay, a survivor if there is one. Let the family stand at a window and speak. Let the burial keep a ritual even if it is a changed one. Read the names of the dead aloud when the measure ends, because a village that is allowed to grieve in public is a village that will agree to the next measure.

The case against

1. Almost none of this is causal, and the authors say so themselves. The Mawah investigators state plainly that no conclusion can be drawn about whether the community quarantine worked, because the sick were removed to Monrovia on the same two days the measure began. Markel's team says its escape communities were the exception rather than the rule and that the case is strongest for a naval island under military discipline. The CLEA monitoring data were collected by the mobilisers whose work they describe. The one genuinely randomised result in this report, Christensen and colleagues, is about clinic governance years in advance, not about anything a village does during an epidemic.

2. The yields are terrible and village labour is finite. 8.5 contacts per case to find a fraction of them. Six million people confined for three days to find about 150 cases. 90 million travellers screened for two. Every hour spent on a boundary is an hour not spent on the latrine, the water and the midwife, and for a post-Fall village of 300 the latrine will kill more people than any exotic epidemic (THRIVING library, IN-11).

3. The community-led story is told by people who hate it. Abramowitz and colleagues, who documented the Monrovia community task forces in the most detail, refuse the word empowerment and call the situation medical statelessness and structural violence. They list the costs: militarised young men, women taking the infection risk by default, children dying in quarantine with nobody to feed them, clinics closed and people dying of ordinary things. The book should not present community-led epidemic control as a good in itself. It is what people do when they have been abandoned.

4. It allocates risk by sex and age and should say so. The carer is a woman in nearly every account. Her measured infection rate was 24% against under 8%. A rule that says nurse them at home is a rule that says the women of this household will take the risk. The Western Area tracers were stigmatised. The burial teams took the worst of it.

5. The strongest measures are the ones with the worst history. The cordon is the measure most likely to work on paper and most likely to become violence in practice, from Richelieu's Pyrenean line to West Point to the 483 recorded attacks in eastern DRC. **Jonas Herby, Lars Jonung and Steve Hanke** (2022), whose work is contested on method by **Neil Ferguson** and others, put the mortality effect of general movement restriction near zero, and HY-07 is right that this remains genuinely unresolved among serious people.

6. The historical successes are not transferable in the way they look. Gunnison had two railways, telegraphed news of the epidemic moving west, a self-sufficient ranching economy, low density and a town that agreed with its physician. American Samoa had a sea around it and a governor with radio. Mountain Village had trails that could be watched by a few men. A post-Fall village with four roads, a river crossing and a market its neighbours depend on has none of these. **Protective sequestration is a geography, not a policy.**

7. Modelling results are being quoted as if they were observations, including in this report. Kucharski's care centre thresholds, Fast's Lofa behaviour-change scenarios and the Cochrane quarantine percentages are all model outputs, and the Cochrane certainty rating is very low. I have used them because they are the only quantitative guidance available for designing a village facility, and that is an argument for humility, not for confidence.

10-line summary

1. Every successful measure in the record was decided by an authority people already recognised, and co-opting that authority took longer than imposing anything would have.
2. Mawah, Liberia, is the one documented negotiation: ten days of talks, the paramount chief brought onto the task force, food and a nurse delivered before the checkpoint went up, 22 cases before and none for seven weeks after.
3. West Point, five weeks earlier in the same country, sealed 70,000 people with no consultation and no food, killed a boy and collapsed in 10 of 21 days.
4. Food is not a humanitarian afterthought to quarantine, it is the mechanism: thousands broke Sierra Leone's quarantines to eat, and four of ten contact tracers named hunger as their main obstacle.
5. Measures delay rather than prevent: 1918 cities with lower first peaks had higher second peaks and got them 6 to 8 weeks later instead of 10 to 14.
6. Fever is a bad entry criterion. A quarter of Ebola index cases reported none, and those cases produced 41% of all onward transmission.
7. Contact tracing yields little and costs much: 8.5 contacts per case, and only 22% of cases were already on a list when they fell ill. A village of 300 can trace about five cases before it runs out of people.
8. The household carer took 24% infection against under 8% for other contacts, and only 14% used any barrier at all. What protected people was distance, not equipment.
9. Burial matters absolutely for haemorrhagic fevers, matters through the funeral meal and water for cholera, and does not matter at all for influenza, measles or typhoid.
10. Fines that escalate to imprisonment mark a measure that has already lost consent, and in the record it never gets it back.

Open questions

1. **Did any self-imposed village cordon ever save its neighbours?** Still nobody has reconstructed mortality in the parishes around Eyam, and the same gap exists for Gunnison's neighbours and for Mountain Village's.
2. **Would Mawah have ended the same way without the quarantine?** The sick were removed on the same two days. The authors say the question is unanswerable and I agree.
3. **What is the real secondary attack rate in a village isolation hut run by lay people without laboratory triage?** Neither of Kucharski's two decisive parameters has ever been measured in such a facility.
4. **Does a clean dry cloth on a coughing patient's face help?** The filtration data say plausibly yes, the only trial was of carers rather than patients, and 1918 answered a different question.
5. **Are survivor carers measurably safer?** No study has compared their infection rate with other carers, in any outbreak.
6. **How long does a village tolerate a measure?** 1918 cities managed 2 to 8 weeks, Mawah 31 days, Gunnison four months, Eyam sixteen months at enormous cost. Nobody has modelled the tolerance curve, and it is the single most useful missing number.
7. **Is 42 days right?** Djaafara and colleagues say 63 is safer. Unresolved.
8. **What does trust cost to build, and does it decay?** Christensen's clinics were monitored for two years before the epidemic. Nobody knows the minimum lead time or the half-life.
9. **Does a community-written bye-law outperform an imposed one when both are unenforceable?** CLEA's communities wrote their own and reported 92% in progress, but the data are self-reported and no transmission outcome was measured.

Sources to read in full

1. **CDC. 2015. Community Quarantine to Interrupt Ebola Virus Transmission, Mawah Village, Bong County, Liberia. *MMWR* 64(7):179-182.** Four pages. The only step-by-step account of a negotiated

village quarantine in the literature, with the objections and what was given in exchange.

2. **Abramowitz SA and colleagues. 2015. Community-Centered Responses to Ebola in Urban Liberia: The View from Below. *PLoS NTD* 9(4):e0003706.** The four-tier community system, built from nothing, with the costs named.
3. **Reichler MR and colleagues. 2018. Household Transmission of Ebola Virus. *J Infect Dis* 218(5):757-767.** The best evidence anywhere on what protects a household carer, and the fever finding that should change every case definition.
4. **Hatchett RJ, Mecher CE, Lipsitch M. 2007. *PNAS* 104(18):7582-7587.** Read the second-wave section, which is the part everyone skips and the part a village needs.
5. **Christensen D, Dube O, Haushofer J, Siddiqi B, Voors M. 2021. Building Resilient Health Systems. *Quarterly Journal of Economics*.** The one randomised trial in this literature, and it says trust is the intervention.
6. **Markel H and colleagues. 2006. Nonpharmaceutical Influenza Mitigation Strategies, US Communities, 1918-1920. *Emerging Infectious Diseases* 12(12).** Three pages on the six communities that escaped and why the authors would not generalise.
7. **WHO. 2014. How to conduct safe and dignified burial of a patient who has died from suspected or confirmed Ebola or Marburg virus disease. WHO/EVD/Guidance/Burials/14.2, 30 October 2014.** Seventeen pages, twelve steps, and over half of it social rather than microbiological.
8. **Davies A and colleagues. 2013. Testing the Efficacy of Homemade Masks. *Disaster Medicine and Public Health Preparedness*.** The filtration table for household fabrics, and the authors' own warning that this is a last resort.
9. **Wallis P. 2006. A Dreadful Heritage: Interpreting Epidemic Disease at Eyam, 1666-2000. *History Workshop Journal* 61(1):31-56.** Read before using Eyam for anything.

At the bedside after the Fall

The household

Minimum viable version. Report the first strange illness to the healer the same day, whether or not there is fever. One named carer, chosen for being an adult who is not pregnant, not nursing, not old and not ill, and a survivor of this illness if there is one. Everyone else stays at least a metre away, stops eating with the patient, stops touching them, and stops sleeping with or near them. The patient's own plate, cup, spoon, towel and bedding, boiled separately. Soap at the door. A covered bucket. The infants and the pregnant moved out that day. Nobody touches, washes or kisses the body of someone who died of a feared fever.

What it needs to start. Soap or lye, a pot for boiling, spare cloth, a bucket with a lid, and the willingness to tell the healer before the household is certain.

The first failure to expect. The household will wait until it is sure, because being wrong is shameful and being isolated is frightening. That delay is the two days that decide the epidemic. The counter is not discipline, it is the healer saying in public, repeatedly and before anything happens, that reporting early is a service and that a family who reports will be fed.

The village of 300

Minimum viable version. A rule agreed in peacetime that names who may call an epidemic, what they may ask for, who feeds the isolated, and who may end it. Four syndromic case definitions anyone can recite. One exercise book kept by one literate person with a line per case: name, house, date of first symptom, symptoms, date isolated, household, visitors, outcome. A weekly bar chart on the same page. An isolation hut of two to four beds with one door, its own latrine and a triage bench outside it. A carer rota of at least six. A burial team of three with a fixed ritual

the families have already agreed to. A food rota with a named household responsible for each isolated household. One entrance and one place where goods change hands.

What it needs to start. The hut and the latrine, buildable in a week. Cloth, soap and a known-strength bleach if any survived. The exercise book. A food reserve set aside in advance, roughly 380 kg of grain-equivalent to feed 30 people for 21 days [VERIFY, my arithmetic]. And the one thing that cannot be improvised in a crisis: a dispensary people already trust, built in the years before.

The first failure to expect. The second family hides its sick, because the first family went hungry, or was gossiped about, or was still shut in after everyone thought it was over. When that happens the register goes blind and everything downstream of it stops working. The counter is food on the doorstep, a visible end date, public thanks, and no punishment ever for a late report.

The district of 3,000

Minimum viable version. A common rule set agreed among the villages before anything happens, including what the district owes a quarantined village in food, fuel and medical help. Ten beds with genuine separation of suspected from confirmed and a clean zone no patient enters. A travellers' house on the main road, fed by the district. Village registers collected weekly into one district count. A burial ground set aside with a register of names. A microscope if one survived, because telling malaria from the thing you fear is the triage decision the whole care site rests on.

What it needs to start. A building that can be divided. A reserve able to feed about 5% of the district for three weeks, roughly 1.5 tonnes of grain (THRIVING library, HY-07). One person with medical standing who also has local standing, because that combination is what the Mawah investigators identified as the bridge.

The first failure to expect. The district orders something the villages did not agree to, most likely a market closure at harvest, it is ignored, and the authority is gone when it is needed. The second failure is the one the care centre evaluations found: the good jobs go to the chief's relatives, and in a district of 3,000 everyone knows it.

Protocols

Protocol 0. The one-page epidemic checklist

1. **Name what you see.** Three or more people ill alike in two weeks, or one case of fever with rash, bleeding, or three or more watery stools in a day. Write it down today.
2. **Sort it.** Rash, cough or bleeding with fever, person to person, go on. Watery stool with vomiting and several cases on one water source, go to the water and the latrine and stop. Fever and chills with no spread in the house, malaria, do not isolate.
3. **Isolate the sick, not the family.** One carer. Move out infants, pregnant women and the frail.
4. **Start the book.** One line per case, with the date of first symptom.
5. **List the contacts by name and date of last exposure.** Expect five to nine per case.
6. **Call the meeting.** Whoever the village already obeys, in the open, before any rule is announced.
7. **Fix the food first.** Name the households who will feed the isolated, every day, and say so aloud.
8. **Announce the rule, the end date and the counting rule together.** Never one without the others.
9. **Bury safely and visibly** if the disease spreads by the body, with the family present and the ritual kept.
10. **Count weekly, say the count aloud, and end on the stated day.**

Protocol 1. The first ten cases

1. **Case 1.** Record it the same day: name, house, age, date and hour of first symptom, every symptom, where this person has been in the last 21 days, who sleeps in the house, who visited in the last 7 days. Isolate within the house. Do not wait for fever.

2. **Cases 2 and 3.** Ask one question of each: were you in the same house, or in the same gathering, as case 1? If yes, you have one chain and tracing will work. If no, you already have two chains and tracing will not keep up.
3. **Case 4.** Open the isolation hut. Target: first symptom to hut in under 3 days. Triage bench outside the door and nobody undiagnosed in the same room as a confirmed case.
4. **Case 5.** Count your contacts. At five to nine per case you now have 25 to 45 people to watch, which in a village of 300 is 8 to 15%. **This is the decision point.**
5. **Cases 6 to 10.** If more than about one in ten of the village is under watch, stop tracing. Put every hand into isolating the clearly sick, protecting the carers, burying safely and keeping the water clean.
6. **At ten cases**, draw the chart: cases per week since the first. Rising, flat or falling. Say the answer aloud at the next meeting whichever way it goes.
7. **Tolerance.** Two days of over-isolating a household is cheap. Two days of under-isolating a haemorrhagic fever is not.

Protocol 2. The village case definitions

Recite these four. Any one of them is an alert and must reach the healer the same day.

1. **Watery stool:** three or more loose or liquid stools in 24 hours, with or without vomiting.
2. **Fever with rash:** rash with fever, often with runny nose, tiredness or headache.
3. **Bleeding:** bleeding from gums, nose, eyes or anywhere unexplained, with or without fever.
4. **Unusual cluster:** three or more people suddenly ill or dead with the same signs, in the same part of the village, in the past two weeks.

Add: **any death in a person who was well a week ago**, and **cough with blood-streaked sputum.**

Tolerance. Do not require fever for any of them. A quarter of Ebola index cases reported none and they produced 41% of the onward cases. If you must use one word, use **ill**, not **feverish**.

Protocol 3. Counting on paper

1. **One book, one keeper, one page per week.**
2. **The line list,** one row per person, columns in this order: number, name, house, age, date of first symptom, symptoms, date isolated, who they live with, who visited in the 7 days before, outcome, date of outcome.
3. **The contact list,** one row per contact: name, house, the case they were exposed to, date of last exposure, date the watch ends, and a tick for each day somebody asked them how they were.
4. **The chart.** Along the bottom, one space per week. Above each space, one mark per case by **date of first symptom**, not date of death and not date of isolation.
5. **Read it once a week, aloud.** More marks than last week means it is growing. The same means it is holding. Fewer for two weeks running means it is turning.
6. **Tolerance.** If the dates of onset are missing, the book is nearly worthless. If you have only one column, keep that one.

Protocol 4. Contact tracing, and when to stop

1. **A contact is** anyone who slept in the same dwelling after symptoms began, touched the person alive or dead, touched their fluids, clothes, towels or bedding, had sex with them, or breastfed or was breastfed by them. For a coughing illness add more than about 15 minutes within 2 metres indoors.
2. **List them by name with the date of last exposure.** That date starts the clock.
3. **Choose tracers from the village itself, in the open**, one per quarter of the village, and say publicly who they are and why they were chosen.

4. **Watch them at home, never together.** Putting contacts in one building is how a quarantine becomes an outbreak.
5. **Length from last exposure:** haemorrhagic fever 21 days, smallpox 17, pneumonic plague 7, measles days 5 to 21, chickenpox days 10 to 21, influenza-like illness 4 and expect it to fail, unknown 21. Cholera, typhoid and dysentery: no quarantine, watch the water.
6. **Ask once a day at the door,** write the answer down even when it is nothing.
7. **Feed them.** A named household brings food, water and fuel to the threshold daily. **A quarantine you cannot feed should not be ordered.**
8. **Release on the stated day.** Say the date aloud at the start.
9. **Stop tracing when more than about one person in ten in the village is under watch.** Say aloud that you are stopping and why. At 8.5 contacts per case, ten cases exceeds this in a village of 300.

Protocol 5. Protecting the carer

1. **One carer,** in this order: a survivor of this illness in this outbreak, then a healthy adult of 20 to 50, then anyone. Never anyone pregnant, nursing, under 15, over 60 or chronically ill.
2. **Everyone else, four rules:** stay at least 1 metre away, do not eat with the patient, do not touch the patient, do not sleep with or near them. These are the four behaviours with a measured protective effect.
3. **Soap and water before and immediately after every entry,** a full count of twenty.
4. **A clean dry cloth over the patient's mouth and nose** if they are coughing, changed and boiled daily. Two layers of a tea-towel-weight cloth filters best of the household fabrics tested.
5. **The carer's own cloth, if worn, must be dry.** Boil it daily and change it the moment it is damp. A damp reused mask may be worse than none.
6. **Change outer clothing at the door** where there is vomiting, diarrhoea or bleeding, and boil it.
7. **Take the covering off in the same order every time, with a second person calling the steps aloud:** hands, then gloves or hand coverings, then hands, then outer clothing rolled away from the body, then hands, then foot coverings, then hands again. Practise this once before you need it.
8. **Chlorine, if you have a bleach of known strength:** about 1 part in 10 of a 5% bleach for surfaces, vomit, blood and the dead, and about 1 part in 100 for soaking linen and utensils, mixed fresh daily [VERIFY, my dilution arithmetic from stated concentrations]. Clean the surface first or it will not work. Never on hands. Never sprayed into a room with people in it.
9. **Rotate.** At least six carers on the rota in a village. Exhaustion is when procedures are skipped.
10. **Tolerance.** With no cloth, no bleach and no gloves, do steps 1, 2, 3, 6 and 9. They are most of the measured benefit.

Protocol 6. Feeding the isolated

1. **Decide the food before you announce the measure.** Not after, not alongside.
2. **Name one household responsible for each isolated household,** by name, in public.
3. **Deliver daily to the threshold:** food, drinking water, fuel. Step back, let them collect, speak from a distance.
4. **Plan 2,100 kcal and 15 litres of water per person per day,** adding 300 kcal daily in pregnancy and 500 while breastfeeding.
5. **For 30 people for 21 days, set aside roughly 380 kg of grain-equivalent plus whatever fat, salt and vegetables you have** [VERIFY, my arithmetic].
6. **The daily delivery is also the daily symptom check.** Ask, and write it down.
7. **If the food fails for two days running, end the quarantine openly** rather than let it be broken.
8. **Tolerance.** If the village cannot feed 10% of itself for three weeks, it cannot run a contact quarantine, and should plan for isolation of the sick and safe burial only.

Protocol 7. Burial when it matters

For haemorrhagic fevers and for cholera. **Not** for influenza, measles, typhoid or whooping cough, where restricting burial buys nothing and costs trust.

1. **Three roles that do not touch the body:** a supervisor, a family liaison, and whoever leads prayers. Name them first.
2. **Before anyone prepares,** sit with the family, offer condolence, and get the agreement of their chosen representative. Ask them: what happens to the belongings, what prayers, who carries, where the grave goes, who may watch.
3. **Offer a substitute act** for touching: sprinkling water, placing a cloth or an object in the grave, speaking at the graveside.
4. **A team of three** to handle the body, in long sleeves, with oiled cloth or leather over the hands, cloth over mouth and nose, and foot coverings.
5. **Wrap the body in the bedding it died in** without shaking it out, and carry it on a hurdle.
6. **Bury the same day,** at least 2 metres deep if the ground allows, at least 50 metres from any water source or dwelling, never uphill of a well. Lime or ash before filling. Do not reopen.
7. **The family may carry, may lower, may fill, and may pray,** with hands washed with soap afterwards.
8. **Burn or boil everything the team wore** and wash with soap at once.
9. **No meal served at the gathering** where cholera is the cause, and no shared water from a nearby well.
10. **Write the name in the register.**
11. **Tolerance.** If a family refuses, do not use force. Let them choose the grave, let them watch, let them name the team. A slightly less safe burial they accept is safer than a safe one they evade.

Protocol 8. Deciding, announcing, enforcing and ending

1. **Before any epidemic,** agree in a village meeting: who may call one, what they may ask for, who feeds the isolated, and who may lift the rules. Write it down. This is the step that cannot be done in a hurry and is the one that decides everything else.
2. **When it comes, explain before you propose.** Take days over it. Go to whoever people already obey and bring them onto the deciding body rather than instructing them.
3. **Ask what they object to, and expect two answers:** food and income, and medical care. Meet both before the rule starts.
4. **Announce three things together, in one sentence:** the rule, the date it ends, and the count that would let it end earlier or require it to run longer.
5. **Use watchers, not guards.** Gunnison's barricades held because the town agreed with them. Florence's cordon leaked past bored soldiers.
6. **Never escalate punishment.** If people are breaking the rule, the rule is wrong or the food has failed. Fix those instead.
7. **Count in public, weekly.**
8. **End it when the count says so:** twice the longest incubation period with no new case. 42 days for a haemorrhagic fever, 34 for smallpox, 42 for measles, 14 for pneumonic plague, 42 if you cannot name it.
9. **Then keep watching quietly for three more months,** and expect a second wave anyway, sooner and sharper if your first wave was small.
10. **End it with the names of the dead read aloud,** and with public thanks to the first family that reported.

Protocol 9. The measures that do more harm than good

Do not do these. Every one has a body count.

1. **Sealing a family into one house with a case.** The household is 50 to 100 times more dangerous than the village.
2. **Sealing a populated area without consultation or food.** West Point.
3. **Armed guards at a boundary.** The weapon arrives before the benefit.
4. **Fever screening at a gate.** Two cases in 90 million, and it teaches the wrong rule.
5. **Fumigating goods, mail or baggage while people walk past.** Nome, 1918.
6. **Spraying or fogging disinfectant into rooms.** Dangerous, no proven benefit.
7. **Killing cats, dogs or rats without controlling the fleas.** You remove the predators and scatter the vectors.
8. **Blaming a family, a trade, a stranger or a group.** Over two hundred pogroms in 1348 to 1349, several before the plague arrived.
9. **Forcing a burial.** It produces a secret one.
10. **Burial restrictions for diseases that do not spread through the body.** Pure cost.
11. **Fines, and then gaol.** The measure has already failed.
12. **Isolating cholera patients instead of fixing the water.** The commonest mistake a frightened village makes.

Numbers to carry

1. **Three days from first symptom to isolation.** The threshold at which a haemorrhagic fever epidemic turns over. Sierra Leone's care centres reached 2.9 days against 5.8 elsewhere.
2. **Eight and a half contacts per case, and a tenth of the village.** Stop contact tracing when more than one person in ten is under watch, which in a village of 300 happens at about five to seven cases.
3. **One in four carers.** 24% of household care providers caught Ebola against under 8% of other contacts, and only 14% of them used any barrier at all.
4. **One metre, no shared meals, no touching, no sleeping near.** The four behaviours with a measured protective effect in the household record.
5. **A quarter of cases have no fever, and they cause two fifths of the spread.** Never make fever the entry condition.
6. **2,100 kcal and 15 litres of water per person per day.** Thirty people for 21 days is roughly 380 kg of grain-equivalent.
7. **Forty-two days, twice the longest incubation, with no new case.** 34 for smallpox, 42 for measles, 14 for pneumonic plague, 42 when you cannot name it. Then three more months of quiet watching.
8. **Act within seven days and hold for at least nine weeks.** In 1918, early cities had a median excess death rate of 451 per 100,000 against 580, and cities holding 65 days or more had 451 against 559.
9. **A small first wave buys a sooner, sharper second.** Lower first peaks correlated with higher second peaks (rho = -0.53) arriving in 6 to 8 weeks instead of 10 to 14.
10. **0.5% for surfaces, corpses and fluids. 0.05% for skin, linen and utensils.** From a 5% bleach, roughly 1 part in 10 and 1 part in 100. Never chlorine on hands instead of soap, never on a dirty surface, never sprayed into an occupied room.

References

1. Markel H, Lipman HB, Navarro JA, et al. 2007. Nonpharmaceutical Interventions Implemented by US Cities During the 1918-1919 Influenza Pandemic. *JAMA* 298(6):644-654. Relied on via (THRIVING library, HY-07), not read directly in this session.
2. Hatchett RJ, Mecher CE, Lipsitch M. 2007. Public health interventions and epidemic intensity during the 1918 influenza pandemic. *PNAS* 104(18):7582-7587. Full text read. https://pmc.ncbi.nlm.nih.gov/articles/PMC1849867
3. Markel H, Stern AM, Navarro JA, Michalsen JR. 2006. Nonpharmaceutical Influenza Mitigation Strategies, US Communities, 1918-1920 Pandemic. *Emerging Infectious Diseases* 12(12). Full dispatch read.

https://wwwnc.cdc.gov/eid/article/12/12/06-0506_article

4. Colorado Virtual Library and 9News Denver features on Gunnison's 1918 quarantine, and UCLA Office of Instructional Affairs, Social Distancing: A Brief Historic Perspective. Secondary summaries read via search results only. https://www.coloradovirtuallibrary.org/, https://ioa.ucla.edu/node/1304
5. McLeod MA, Baker M, Wilson N, et al. 2008. Protective Effect of Maritime Quarantine in South Pacific Jurisdictions, 1918-19 Influenza Pandemic. *Emerging Infectious Diseases* 14(3):468-470. Relied on via (THRIVING library, HY-07).
6. Wikipedia entries John Martin Poyer and SS Talune, and US Naval Institute *Proceedings*, May 2020, Lest We Forget: Preventing Influenza in American Samoa, and NZHistory, Influenza in Samoa. Secondary, read via search summaries. https://en.wikipedia.org/wiki/John_Martin_Poyer, https://nzhistory.govt.nz/page/influenza-samoa
7. Senior Voice Alaska. 2015 and 2024. 1918: The Big Sickness spreads across Alaska. Secondary. https://www.seniorvoicealaska.com/story/2015/04/01/columns/1918-the-big-sickness-spreads-across-alaska/732.html
8. Wallis P. 2006. A Dreadful Heritage: Interpreting Epidemic Disease at Eyam, 1666-2000. *History Workshop Journal* 61(1):31-56. Abstract and 2005 LSE working paper version only. https://researchonline.lse.ac.uk/id/eprint/15606
9. Whittles LK, Didelot X. 2016. Epidemiological analysis of the Eyam plague outbreak of 1665-1666. *Proceedings of the Royal Society B* 283:20160618. Relied on via (THRIVING library, HY-07).
10. Wikipedia, Great Plague of Marseille, and Ermus C, Plague in Provence, *Arcadia*, Environment and Society Portal. Secondary, read via search summaries, figures mutually inconsistent. https://en.wikipedia.org/wiki/Great_Plague_of_Marseille, https://www.environmentandsociety.org/arcadia/plague-provence-early-advances-centralization-crisis-management
11. Wikipedia, Nicolas Roze (chevalier). Secondary. https://en.wikipedia.org/wiki/Nicolas_Roze_(chevalier)
12. History Learning Site, The London Plague of 1665, and Defoe D, *A Journal of the Plague Year* (1722). Read via search summaries. Defoe is a literary reconstruction, not a witness account. https://www.historylearningsite.co.uk/
13. History Today, The War on Dogs. Secondary, on the 1665 Common Council order to kill dogs and cats. https://www.historytoday.com/archive/history-matters/war-dogs
14. Rahelinirina S and colleagues. Assessing the effectiveness of intervention to prevent plague through community and animal-based survey, Madagascar. Read via search summary and Emory University news summary only. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10727364/
15. Wikipedia, Strasbourg massacre, and Basel Massacre, Snowden F quoted in secondary source for the figure of over two hundred pogroms. All secondary, flagged as contested. https://en.wikipedia.org/wiki/Strasbourg_massacre
16. BiblioAsia (National Library Board Singapore), The Plague Fighter: Wu Lien-teh, and University of Hong Kong Digital Repository, Plague Pandemic in Manchuria. Secondary. https://biblioasia.nlb.gov.sg/files/pdf/vol-16/issue-2/v16-issue2_PlagueFighter.pdf, https://digitalrepository.lib.hku.hk/plague
17. Abramowitz SA, McLean KE, McKune SL, et al. 2015. Community-Centered Responses to Ebola in Urban Liberia: The View from Below. *PLoS Neglected Tropical Diseases* 9(4):e0003706. Full text read. https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0003706
18. Fast SM, Mekaru S, Brownstein JS, Postlethwaite TA, Markuzon N. 2015. The Role of Social Mobilization in Controlling Ebola Virus in Lofa County, Liberia. *PLOS Currents Outbreaks*, 15 May 2015. Abstract and search summary only. https://pmc.ncbi.nlm.nih.gov/articles/PMC4455978/
19. CDC. 2015. Community Quarantine to Interrupt Ebola Virus Transmission, Mawah Village, Bong County, Liberia, August-October 2014. *MMWR* 64(7):179-182. Full text read.

https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6407a4.htm

20. Pronyk P, Rogers B, Lee S, et al. 2016. The Effect of Community-Based Prevention and Care on Ebola Transmission in Sierra Leone. *American Journal of Public Health* 106(4):727-732. Abstract read directly. Results figures relied on via (THRIVING library, HY-07).
21. Kucharski AJ, Camacho A, Checchi F, et al. 2015. Evaluation of the Benefits and Risks of Introducing Ebola Community Care Centers, Sierra Leone. *Emerging Infectious Diseases* 21(3):393-399. Relied on via (THRIVING library, HY-07) and abstract summary.
22. Reichler MR, Bangura J, Bruden D, et al. 2018. Household Transmission of Ebola Virus: Risks and Preventive Factors, Freetown, Sierra Leone, 2015. *Journal of Infectious Diseases* 218(5):757-767. Author manuscript read in full via text extraction. https://stacks.cdc.gov/view/cdc/78396
23. Tiffany A and colleagues. 2017. Estimating the number of secondary Ebola cases resulting from an unsafe burial. Relied on via (THRIVING library, HY-07).
24. WHO. 2014. How to conduct safe and dignified burial of a patient who has died from suspected or confirmed Ebola or Marburg virus disease. WHO/EVD/Guidance/Burials/14.2, 30 October 2014. Twelve steps read via PBS NewsHour's step-by-step summary and the WHO publication record, not the PDF itself. https://www.who.int/publications/i/item/WHO-EVD-Guidance-Burials-14.2, https://www.pbs.org/newshour/world/12-steps-safely-bury-ebola-victims
25. WHO. 2015. Health worker Ebola infections in Guinea, Liberia and Sierra Leone: a preliminary report, 21 May 2015. Read via search summary and MSF's citation of it. https://medbox.org/document/health-worker-ebola-infections-in-guinea-liberia-and-sierra-leone
26. Olu OO, Lamunu M, Nanyunja M, et al. 2016. Contact Tracing during an Outbreak of Ebola Virus Disease in the Western Area Districts of Sierra Leone. *Frontiers in Public Health* 4:130. Full text read. https://www.frontiersin.org/articles/10.3389/fpubh.2016.00130/full
27. Swanson KC and colleagues. Contact tracing performance during the Ebola virus disease outbreak in Kenema district, Sierra Leone. Read via search summary only. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4916168/
28. Kellogg WH. 1919. Influenza: a study of measures adopted for the control of the epidemic. California State Board of Health. Read via Health Affairs Forefront (2020) and other secondary accounts only. https://www.healthaffairs.org/content/forefront/flu-masks-failed-1918-but-we-need-them-now
29. Davies A, Thompson K-A, Giri K, Kafatos G, Walker J, Bennett A. 2013. Testing the Efficacy of Homemade Masks: Would They Protect in an Influenza Pandemic? *Disaster Medicine and Public Health Preparedness*. Filtration table read via search summary quoting the paper's own values. https://pmc.ncbi.nlm.nih.gov/articles/PMC7108646/
30. MacIntyre CR, Seale H, Dung TC, et al. 2015. A cluster randomised trial of cloth masks compared with medical masks in healthcare workers. *BMJ Open* 5(4):e006577. Abstract and detailed search summary. https://bmjopen.bmj.com/content/5/4/e006577
31. Verbeek JH, Rajamaki B, Ijaz S, et al. Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff. *Cochrane Database of Systematic Reviews*, CD011621. Read via Cochrane infographic, AHRQ PSNet summary and commentaries, not the full review. https://psnet.ahrq.gov/issue/personal-protective-equipment-preventing-highly-infectious-diseases-due-exposure-contaminated
32. CDC. Disinfection and Waste Management in the Ebola Treatment Unit (safety training course e-lecture), and WHO 2014 interim infection prevention and control guidance for Ebola. Chlorine concentrations read via these and secondary summaries. https://www.cdc.gov/vhf/ebola/hcp/safety-training-course/assets/E-Lecture_DisinfectionAndWasteManagementInTheETU.pdf
33. Gunnlaugsson G and colleagues. 1998. Funerals during the 1994 cholera epidemic in Guinea-Bissau, West Africa. Read via search summary quoting the paper's risk ratios and odds ratios. https://iris.landsbokasafn.is/en/publications/funerals-during-the-1994-cholera-epidemic-in-guinea-bissau-

west-a/

34. CDC. 2018. Notes from the Field: Outbreak of Vibrio cholerae Associated with Attending a Funeral, Chegutu District, Zimbabwe. *MMWR 67*(19). Read via search summary. https://www.cdc.gov/mmwr/volumes/67/wr/mm6719a6.htm
35. UNICEF and WHO. 2014. Social Mobilization: Key Messages, 26 August 2014. Relied on via (THRIVING library, HY-07).
36. Wikipedia, Womey massacre, and Associated Press and CNN reporting of September 2014, The Cable (Nigeria) on the 2015 convictions. Secondary, mutually inconsistent on sequence. https://en.wikipedia.org/wiki/Womey_massacre
37. Insecurity Insight. 2020. Attacks on Health Care During the 10th Ebola Response in the DRC, November 2020. Read via search summary. https://www.insecurityinsight.org/wp-content/uploads/2020/11/Attacks-on-Health-Care-During-the-10th-Ebola-response-in-the-DRC-November-2020-FINAL.pdf
38. Medecins Sans Frontieres. 2019. DRC: MSF Ebola treatment center in Butembo attacked, and DRC: MSF suspends medical activities after Ebola Treatment Center attack. https://www.doctorswithoutborders.org/latest/drc-msf-ebola-treatment-center-butembo-attacked
39. Sherbro Foundation. 2014. Paramount Chiefs Now Authorized to Enforce Community Ebola Practices, Anadolu Agency, Sierra Leoneans fined for handshakes, hiding Ebola patients, Naharnet, Sierra Leone Will Jail Ebola Law Violators (June 2015), Awoko (Sierra Leone) on Bo district bye-laws, Ahram Online on the president's uncle. All press and NGO reporting, read via search summaries. https://sherbrofoundation.org/2014/08/26/paramount-chiefs-now-authorized-to-enforce-community-ebola-practices/
40. Associated Press and Agence France-Presse reporting of Sierra Leone's three-day lockdown, 19 to 21 September 2014. Read via search summaries, figures inconsistent between outlets. https://wtop.com/news/2014/09/sierra-leone-begins-3-day-ebola-lockdown/
41. Skrip LA, Bedson J, Abramowitz S, et al. 2020. Community engagement in outbreak response: lessons from the 2014-2016 Ebola outbreak in Sierra Leone. *BMJ Global Health*. Read via search summary and the biorxiv preprint record, not the full text. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7445350/
42. Christensen D, Dube O, Haushofer J, Siddiqi B, Voors M. 2021. Building Resilient Health Systems: Experimental Evidence from Sierra Leone and the 2014 Ebola Outbreak. *Quarterly Journal of Economics*. Abstract and J-PAL summary only. https://www.povertyactionlab.org/evaluation/
43. Dube O and colleagues. 2020. Community-based Crisis Response: Evidence from Sierra Leone's Ebola Outbreak. Working paper. Abstract and search summary only. The finding that community care centres roughly tripled the increase in reported cases comes from this summary.
44. Sphere Association. *The Sphere Handbook.* The 2,100 kcal and 15 litres per person per day figures were read via secondary training materials quoting the Handbook, not the Handbook itself. https://www.spherestandards.org/wp-content/uploads/2024-05-30-Jhpiego-Introduction-to-Sphere.pdf
45. Associated Press reporting of WFP food distribution at Waterloo, Sierra Leone, October 2014, and UNMEER external situation report, 24 March 2015. https://wtop.com/news/2014/10/food-deliveries-in-sierra-leone-to-fight-ebola/, https://ebolaresponse.un.org/sites/default/files/150324_-_unmeer_external_situation_report.pdf
46. Christian Aid and the Disasters Emergency Committee. 2014. Ebola: urgent need to provide food for people in quarantine to prevent further spread. https://www.dec.org.uk/press-release/ebola-urgent-need-to-provide-food-for-people-in-quarantine-to-prevent-further-spread
47. Haas CN. 2014. On the Quarantine Period for Ebola Virus. *PLOS Currents Outbreaks*. Read via Drexel University summary only. https://drexel.edu/news/archive/2014/October/Ebola-quarantine
48. Djaafara BA, Imai N, Hamblion E, Impouma B, Donnelly CA, Cori A. 2021. A Quantitative Framework for Defining the End of an Infectious Disease Outbreak: Application to Ebola Virus Disease. Read via search summary and preprint record. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8024054/

49. WHO. Outbreak Toolkit: investigating an outbreak of unknown disease (standardized data collection tools). Read via search summary quoting the toolkit's wording on case definitions, line lists and epidemic curves. https://www.who.int/emergencies/outbreak-toolkit/standardized-data-collection-tools/investigating-outbreak-of-unknown-disease
50. IFRC. 2021. Global Community Case Definitions List (community-based surveillance), and the community case definition table in *Conflict and Health* (2024) 18, article 578. Read via search summaries. https://cbs.ifrc.org/sites/default/files/media/document/2023-10/ifrc-global-community-definitions-list-2021-en.pdf
51. Jalloh MF, Li W, Bunnell RE, et al. 2017 and 2018. Risk perception and knowledge, attitudes and practices during the 2014-2015 Ebola outbreak in Sierra Leone. *BMJ Global Health* 2(4):e000285 and *Emerging Infectious Diseases* 24(2). Read via search summaries quoting the figures. https://gh.bmj.com/content/2/4/e000285
52. Ebola Response Anthropology Platform and a parallel quality-of-care evaluation, summarised by Social Science in Action, Two evaluations of community Ebola interventions, two different results. Full page read. https://www.socialscienceinaction.org/resources/two-evaluations-of-community-ebola-interventions-two-different-results
53. Brooks SK, Webster RK, Smith LE, et al. 2020. The psychological impact of quarantine and how to reduce it. *The Lancet* 395(10227):912-920. Relied on via (THRIVING library, HY-07).
54. Herby J, Jonung L, Hanke SH. 2022. A Literature Review and Meta-Analysis of the Effects of Lockdowns on COVID-19 Mortality, and the criticism of it by Ferguson and others. Relied on via (THRIVING library, HY-07).
55. THRIVING library, HY-07: Quarantine and isolation: from Ragusa 1377 to Ebola 2014, what worked and what it cost. Read in full.
56. THRIVING library, IN-11: Cholera, typhoid and dysentery: outbreak control and case management. Numbers to carry read.
57. THRIVING library, IN-12: Measles, whooping cough, diphtheria and the childhood killers. Numbers to carry read.