MA-04 Eclampsia and the fevers of pregnancy: magnesium sulfate, Semmelweis and puerperal sepsis

HEALING after the FALL, research library, MA-04

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

Scope and method

This report covers eclampsia, the fits of late pregnancy, labour and the days after birth, with the pre-eclampsia that comes before it, and puerperal sepsis, childbed fever. It builds on the library and does not repeat it. Hand antisepsis and the Semmelweis story are in HY-01, general sepsis in IN-04, antibiotics in IN-05, normal birth and blood pressure thresholds in MA-01, bleeding and retained placenta in MA-02, and Epsom salt in ME-08 (THRIVING library, HY-01, IN-04, IN-05, MA-01, MA-02, ME-08). Operative obstetrics is left to OR-04 and MA-10.

I read in full the WHO prequalification product information for magnesium sulfate injection (RH063), the Sri Lankan puerperal sepsis guideline, and Alexander Gordon's treatise of 1795. Most trials and reviews were read as abstracts, because PubMed, Cochrane and WHO IRIS blocked direct reading. Figures that rest on a search summary or on my arithmetic are marked [VERIFY]. Rules a village must choose are marked [OWNER].

Findings by section

1. Two killers, measured

Hypertensive disorders caused 14.0 per cent of maternal deaths worldwide in 2003 to 2009, behind haemorrhage at 27.1 per cent and ahead of sepsis at 10.7 per cent (Say 2014). WHO puts pre-eclampsia at 3 to 8 per cent of births and hypertensive disorders at about 16 per cent of maternal deaths, about 42,000 women in 2023 (WHO 2026). Most of these deaths are from eclampsia where care is poor (Duley 2009).

Before antibiotics the order was different. In England and Wales maternal mortality sat near 4.6 per 1,000 births for about 80 years, and sepsis caused about half of those deaths until 1937 (THRIVING library, MA-01, reading Loudon 1986). After the Fall that is the order to plan for.

A community of 300 with a birth rate of 30 to 40 per 1,000 has 9 to 12 births a year, so one woman with pre-eclampsia every one to three years. A district of 3,000 has 90 to 120 births, three to ten cases of pre-eclampsia, and, at the rates WHO measured in facilities in 52 countries (70 maternal infections needing hospital care and 11 severe outcomes per 1,000 live births), seven or eight infections and about one severe sepsis a year (GLOSS 2020) [VERIFY: my arithmetic, from facility rates]. The village healer will see these conditions rarely. The district will see them every year. That should decide who keeps which drugs.

2. Finding pre-eclampsia by hand

Pre-eclampsia is new blood pressure of at least 140/90 after 20 weeks, with protein in the urine of at least 0.3 g a day or signs that other organs are affected (WHO 2026). MA-01 sets the village thresholds: recheck at 140/90, urgent at 150/110 (THRIVING library, MA-01). Severe hypertension starts at 160/110, which is also Hesperian's threshold for magnesium (Hesperian NWTND). The warning symptoms in WHO and Hesperian are a headache that will not go, blurred or flashing vision, pain high in the belly or under the right ribs, vomiting, swelling of the face and hands, and little urine. Brisk reflexes and clonus are taught as signs of an irritable brain, but I found no figure for how well they predict fits [VERIFY].

The tools are a cuff and a test for protein. Protein dipsticks at the 1+ threshold have a sensitivity of 0.68 and a specificity of 0.85 in pregnancy, so a third of real proteinuria is missed (Teeuw 2022, secondary). When strips are gone, the old heat test remains: clear urine is heated at the top of a tube, and a cloud that stays after a few drops of dilute acetic acid, which clears phosphate, means protein. Clinical Methods calls it still valid but no longer generally used (Walker 1990). Vinegar is dilute acetic acid. I found no study of its accuracy in pregnancy [VERIFY], so it should be treated as catching heavy proteinuria and missing some light.

The weakest link is the person. In Bangladesh, trained health visitors observed in 1,560 antenatal consultations correctly diagnosed 3 per cent of women with gestational hypertension, 7 per cent with pre-eclampsia and 25 per cent with severe pre-eclampsia (Billah 2021). After the Fall the first failure to expect is a missed diagnosis, not a missing drug.

Some women fit with no recorded high pressure or protein, and many fits come after birth, mostly in the first two days [VERIFY: widely stated, not checked against a primary series]. Blood pressure checks after birth belong in the rule.

In southern Mozambique, women, matrons, birth attendants and healers knew hypertension in pregnancy as a fainting disease or illness of the heart, and eclampsia as illness of the moon or snake illness, caused by a snake inside the woman (Boene 2016). The authors advise working with healers and matrons. Useful local explanations are those that send a woman with a headache and a swollen face to the cuff.

3. Eclampsia before magnesium

There is no modern series of untreated eclampsia. Search summaries of papers from 1907 and 1930, which I could not read, report deaths of 20 to 28 per cent under the conservative treatment of about 1900, 14 per cent at a Berlin clinic and 30.8 per cent at the New York Lying-in Hospital. Stroganoff's morphine and chloral regimen reported 9.8 per cent in 2,208 cases (Temple 1930, search summary only) [VERIFY]. The working figure for eclampsia without effective treatment is one woman in five to one in three, with sedation and quiet bringing it to about one in ten in the best hands.

Bleeding, purging and hot packs were standard in the nineteenth century. American hellebore, Veratrum viride (rhizome), was used from the 1860s to lower blood pressure, and a purified extract was reported in 1940 to give 1.6 per cent mortality in 120 cases (Bryant and Fleming 1940, secondary) [VERIFY]. Veratrum causes vomiting, a slow pulse and heart block, with a narrow margin. Its European relative Veratrum album poisons people who mistake it for yellow gentian, Gentiana lutea, gathered for gentian wine (Garnier 1985, secondary, five cases with low blood pressure and slow heart rate), and for wild garlic, Allium ursinum (Wikipedia, Veratrum album). Gentian has opposite leaves and Veratrum alternate, spiralled leaves [VERIFY: from botanical knowledge, not a source read here]. No village should prepare Veratrum.

The lytic cocktail of chlorpromazine, promethazine and pethidine was used into the 1990s. In three trials with 397 women, magnesium cut maternal death (relative risk 0.14, 95 per cent confidence interval 0.03 to 0.59) and further fits (0.06, 0.03 to 0.12), and the authors wrote that the cocktail should be abandoned (Duley, Gülmezoglu and Chou

2010).

4. Magnesium sulfate: the trials

Pritchard at Parkland Hospital in Dallas published an intramuscular regimen in 1955 and later reported 245 eclamptic women treated under one protocol with one maternal death. The protocol was magnesium, hydralazine when the diastolic reached 110, no diuretics, and delivery, mostly vaginal with oxytocin (Pritchard, Cunningham and Pritchard 1984, abstract only). Outside the United States few believed one centre.

The Collaborative Eclampsia Trial randomised 1,687 women in Africa, Asia and South America. Magnesium gave 52 per cent fewer further fits than diazepam (13.2 against 27.9 per cent) and 67 per cent fewer than phenytoin (5.7 against 17.1 per cent) (Eclampsia Trial Collaborative Group 1995). Pooled with smaller trials, magnesium against diazepam lowered maternal death (relative risk 0.59, 0.38 to 0.92, 7 trials, 1,396 women) and recurrence (0.43) (Duley, Henderson-Smart, Walker and Chou 2010). Against phenytoin, recurrence fell (0.34, 6 trials, 972 women), and the death ratio of 0.50 did not reach significance (Duley, Henderson-Smart and Chou 2010).

The Magpie trial gave magnesium or placebo to 10,141 women with pre-eclampsia in 33 countries. Eclampsia fell from 1.9 to 0.8 per cent, a 58 per cent reduction (40 to 71), 11 fewer fits per 1,000 treated. Maternal death had a ratio of 0.55 (0.26 to 1.14), not significant. Abruption fell (0.67). The baby's risk of death was unchanged. A quarter of women on magnesium had side effects, mostly flushing, against 5 per cent on placebo (Magpie 2002). The number needed to treat was 63 for severe pre-eclampsia and 109 for non-severe (Roberts, Villar and Arulkumaran 2002). Where drug or watching is scarce, magnesium goes to severe disease and eclampsia [OWNER].

In Kano, northern Nigeria, ten facilities switched from diazepam to a modified Pritchard regimen after two days of training. Deaths among eclamptic women fell from 258 in 1,233 (20.9 per cent) in 2006 to 2007 to 23 in 996 (2.3 per cent) in the following year. Staff checked knee jerks with a hammer, about 2 per cent showed toxicity and were given calcium gluconate 1 g, and 6.2 per cent fitted again (Okereke 2012). It was a before and after comparison, but the size of the fall is hard to explain away.

5. The regimens

The Pritchard regimen is mostly intramuscular. A loading dose of 4 g goes intravenously over about five minutes as 20 mL of a 20 per cent solution, with 10 g of the 50 per cent solution by deep intramuscular injection, 5 g into each buttock, each with 1 mL of 2 per cent lidocaine in the same syringe because the injection hurts. Then 5 g goes into alternate buttocks every 4 hours, for 24 hours after the birth or the last fit, whichever is later (WHO PQ RH063). Magpie's intramuscular arm used the same 10 g then 5 g every 4 hours (Roberts, Villar and Arulkumaran 2002). Pritchard's 1955 paper was not read [VERIFY].

The Zuspan regimen is intravenous: 4 g, then 1 g an hour for 24 hours. A fit after 15 minutes is treated with a further 2 g intravenously (WHO PQ RH063). Magpie capped the infusion at 1 g an hour. Zuspan's 1966 paper was not read [VERIFY]. This regimen needs a pump or a counted drip and constant attendance.

For a district without reliable drips the intramuscular regimen is the choice. An intramuscular dose acts within about an hour and lasts three to four hours. The half-life is about four hours with healthy kidneys, and over 90 per cent leaves in the urine within a day (WHO PQ RH063). With no vein, Hesperian gives the 10 g intramuscular dose alone and one more 5 g dose after 4 hours if help has not come (Hesperian NWTND).

Can a woman be given the loading dose and carried to the district? WHO advises exactly that where the full regimen is impossible (WHO PQ RH063). The Cochrane review of 16 trials with 3,020 women found "still no compelling evidence" for any one regimen. For loading dose alone against loading plus maintenance, the eclampsia ratio was 2.00 (0.61 to 6.54) in 462 women, so a doubling of fits cannot be ruled out (Diaz, Long and Oladapo 2023). The rule:

give the full loading dose before a long carry, and maintenance doses on the road if the escort can check reflexes and breathing [OWNER].

Doses are stated in grams of the heptahydrate, the salt with seven waters of crystallisation. A 50 per cent ampoule holds 500 mg per mL, so 5 g is 10 mL (WHO PQ RH063). Epsom salt is also the heptahydrate, but salt that has dried out is stronger per gram [VERIFY: inference from the chemistry]. A dose in grams means nothing unless the form is known.

6. Can Epsom salt become an injection?

The book claims injectable magnesium can be made from Epsom salt. ME-08 graded home-made injection X, recording Serratia outbreaks from compounded magnesium in California and New Jersey in 2005 and the Alabama outbreak of 2011 with nine deaths (THRIVING library, ME-08). This section asks who has managed it and what a village would need, and does not describe how.

The United States Pharmacopeia requires a sterile solution in water for injection, 93 to 107 per cent of the label, a pH of 5.5 to 7.0, bacterial endotoxin of not more than 0.09 units per mg, Type I glass, and the general tests for injections, including sterility and particles (USP 35). Prequalified products contain only magnesium sulfate, water for injection and pH adjusters, and keep 60 months below 30°C (WHO PQ RH063).

The endotoxin limit shows how little room there is. The usual fever threshold for endotoxin into a vein is 5 units per kg per hour, about 300 to 350 units an hour for a woman of 60 to 70 kg (ACC 2017, secondary). A 4 g loading dose at the pharmacopoeia limit carries 360 units, given over 5 to 15 minutes [VERIFY: my arithmetic]. The legal limit sits at about the dose that causes fever. Endotoxin is bacterial debris that survives boiling and sterilising. It has to be kept out from the start and shown absent by a test.

Failures are not confined to back rooms. In 1972 at Devonport, dextrose bottles from a licensed manufacturer went out from a faulty autoclave, and at least four patients died (Meers 1973, abstract only). In Nigeria, 8.25 per cent of 160 samples of factory-made intravenous fluids carried bacteria and 36.25 per cent were pyrogenic in the rabbit test (Atata 2007, abstract only). These were factories with autoclaves and inspectors.

From the monograph and the failures, a district would need salt of known purity tested for heavy metals, freshly distilled water for injection, sealable clean glass, an autoclave with recorded time and temperature and biological indicators, an endotoxin test (rabbit or horseshoe crab reagent), a sterility culture, and a trained person and record for every batch [VERIFY: my synthesis]. Bath and garden grades are not made to a medicinal standard. The intramuscular route does not escape: a non-sterile 10 g dose deep in muscle risks abscess, gas gangrene or tetanus [VERIFY: inference, no outbreak report found]. Oral Epsom salt is a purgative, and ME-08 found no trial of it for eclampsia.

Verdict: the injection can be made only at the standard of a pharmaceutical plant, and has killed people even there when one step failed. A village cannot make it, and a district could not prove its product safe without endotoxin and sterility tests. Grade X stands. The plan is to secure factory ampoules, which keep five years, while they can be found [OWNER].

The case for trying anyway deserves a hearing. If eclampsia kills one woman in five and magnesium cuts that sharply, a district without ampoules might think a doubtful injection better than nothing. But the alternative is not nothing. Diazepam, sedation, quiet and delivery reach Stroganoff's ten per cent, and a contaminated injection adds septic shock to a fitting woman. The report recommends no [OWNER].

7. Overdose and the watch

The knee reflex disappears above about 3.5 mmol/L, breathing slows above about 5.0 and the heart may stop above about 7.0 (THRIVING library, ME-08). The reflex goes before the breathing, so the knee jerk is the cheapest monitor in medicine.

WHO gives three checks before every maintenance dose: breathing of at least 16 a minute, knee reflexes present, and urine of at least 30 mL an hour over the previous 4 hours. If one fails, the dose is withheld (WHO PQ RH063). The RH062 version in ME-08 gives 25 mL an hour. Hesperian says not to give magnesium if breathing is under 12 or she has passed no urine in 4 hours (Hesperian NWTND). The safer village rule is WHO's: hold the dose below 16, and treat below 12 as an emergency.

Magnesium leaves only in the urine, and severe pre-eclampsia damages the kidneys. A woman passing little urine stores each dose. Measuring urine needs a catheter or bedpan, a jug and an hourly record.

The antidote is calcium gluconate, 1 g (10 mL of 10 per cent) intravenously over 3 minutes, with breathing assisted (WHO PQ RH063). ME-08 gives 1 to 2 g, and Kano used 1 g (Okereke 2012). Without calcium, breathing for her with bag and mask keeps her alive while the kidneys clear the magnesium over hours [VERIFY: inference from the half-life].

Most hospital overdoses came from drips. The Institute for Safe Medication Practices collected 52 accidental overdoses on labour wards, some fatal, many from a whole 40 g bag running in (Simpson and Knox 2004, secondary). Intramuscular doses avoid that. Undiluted 50 per cent solution never goes into a vein. Flushing is common and is not a reason to stop. The order of overdose is flushing, low blood pressure, lost knee jerk, slow breathing, then heart block (WHO PQ RH063).

8. Delivery is the cure, and blood pressure

Pre-eclampsia ends when the placenta is out. Magnesium prevents fits but does not cure. Parkland delivered its eclamptic women (Pritchard, Cunningham and Pritchard 1984). WHO allows expectant management of severe pre-eclampsia before 34 weeks only with monitoring in hospital, and advises induction where the baby is not viable (WHO 2011, with 2018 update, secondary). After a fit, delivery is planned within hours once she is stable [VERIFY: a 12-hour limit is often quoted from the WHO manual, which could not be read]. Induction and caesarean belong to MA-03 and OR-04.

Severe pressure of 160/110 or more causes strokes. ACOG advises treatment within 30 to 60 minutes with intravenous labetalol, intravenous hydralazine or immediate-release oral nifedipine (ACOG 2019, secondary). Doses were not checked against a primary source [VERIFY]. The aim is to bring the pressure below severe, not to normal, because a fast fall can starve the placenta. Ergometrine raises blood pressure and is not given in pre-eclampsia (THRIVING library, MA-02). After the Fall these drugs exist only as salvage, and nifedipine tablets store best.

9. Prevention: aspirin, willow, calcium, eggshell and plants

Low-dose aspirin has the strongest support. A Cochrane review of 77 trials with 40,249 women found 18 per cent less pre-eclampsia (relative risk 0.82, 0.77 to 0.88, 61 treated to prevent one), with fewer preterm births (0.91) and baby deaths (0.85) (Duley, Meher, Hunter, Seidler and Askie 2019). ASPRE gave 150 mg a night from 11 to 14 weeks to 36 weeks in 1,776 high-risk women and cut preterm pre-eclampsia from 4.3 to 1.6 per cent (odds ratio 0.38) (Rolnik 2017). The usual British dose is 75 mg (NIHR 2019). WHO advises starting before 20 weeks in high-risk women (WHO 2011). High risk usually means previous pre-eclampsia, chronic hypertension, kidney disease, diabetes, autoimmune disease or twins [VERIFY: common guideline list].

Aspirin cannot be grown. Willow bark, Salix alba and related species (inner bark), yields salicylic acid but not the acetylated form that blocks platelets. Willow extract with 240 mg of salicin a day left maximal platelet aggregation at 61 per cent, against 78 per cent on placebo and 13 per cent on 100 mg of aspirin (Krivoy 2001, abstract only). Willow is not a substitute.

Calcium of at least 1 g a day halved pre-eclampsia (relative risk 0.45, 0.31 to 0.65, 13 trials, 15,730 women), more so on low-calcium diets (0.36). The authors warn that the effect sits in small trials, and HELLP syndrome was more

common with calcium (2.67), unexplained (Hofmeyr 2018). Trials in India and Tanzania found 500 mg a day non-inferior to 1,500 mg for pre-eclampsia (3.0 against 3.6 per cent, and 3.0 against 2.7 per cent), though not for preterm birth in Tanzania (Dwarkanath 2024, secondary).

Eggshell gives calcium a village can make. It holds about 380 mg of calcium per gram, absorbed about as well as calcium carbonate. A Tanzanian study proposed boiling shells for 10 minutes and cooking the crushed shell into food for 20 minutes, with Salmonella the main risk, and found women willing (Bartter 2018). About 1.3 g of powdered shell gives 500 mg of calcium [VERIFY: my arithmetic]. It must be ground fine. Villages with milk, cheese, bony fish or greens may not need it [OWNER].

No plant prevents or treats pre-eclampsia on the evidence found. The only trial of garlic, Allium sativum, in 100 women showed no clear effect (relative risk 0.78, 0.31 to 1.93) (Meher and Duley 2006). A herbal remedy for pre-eclampsia is a reason for a woman to stay away from the cuff.

10. Care of a woman who is fitting

Most fits stop within a minute or two. The attendant's work is to prevent harm and the next fit. She is protected from falls and hard edges, not held down, and nothing goes in her mouth. When the fit stops she is turned onto her left side to clear the airway and take the womb off the great veins. One person stays, another fetches the magnesium. The loading dose goes in as soon as it is drawn up, into a vein if one is open and into the buttocks if not. Blood pressure is measured and treated if severe. Urine is measured hourly. The baby's heart is checked after the fit, since it often slows during one and recovers. Delivery is planned once she is stable (WHO PQ RH063, Hesperian NWTND).

With no magnesium, Hesperian gives diazepam 20 mg rectally with the woman on her side, plus 10 mg after 10 minutes if fits continue, no more than two doses (Hesperian NWTND). Diazepam is worse than magnesium, depresses breathing and sedates the baby, but in a fitting woman it is better than nothing [VERIFY: no trial against no treatment, resting on the historical record of sedation].

11. Childbed fever: what the record adds

HY-01 tells the story of Holmes and Semmelweis. The record adds three things.

First, Gordon's treatise, read in full, settles a point HY-01 left open. In the Aberdeen epidemic of 1789 to 1792 he recorded 77 cases, of whom 49 recovered and 28 died, a case fatality of 36 per cent (Gordon 1795). He could foretell which women would fall ill "upon hearing by what midwife they were to be delivered", and he confessed that he had himself carried the infection to a great number of women. He told physicians and nurses to wash carefully and fumigate their clothes, and had the women's linen burnt or purified. The fever began the day after delivery and killed by the fifth day. He bled 20 to 24 ounces and purged, and claimed that 30 consecutive women then survived (Gordon 1795). That claim is uncontrolled, and bleeding a septic woman is harmful. What survives is the epidemiology. Gordon's epidemic was in homes, carried by midwives and doctors.

Second, Semmelweis's annual tables, as transcribed from Carter's translation, show a fact often left out. Over 1841 to 1846 the doctors' First Clinic lost 1,989 mothers in 20,042 births (9.9 per cent) and the midwives' Second Clinic 691 in 17,791 (3.9 per cent). Over 1847 to 1849 the First Clinic fell to 3.0 per cent, and the Second Clinic, which did not wash with chlorine, fell to 1.6 per cent (Semmelweis 1861, via Wikipedia). The Second Clinic's mortality fell by more than half [VERIFY: my arithmetic]. Part of the First Clinic's fall belongs to whatever lowered both. The chlorine effect is the extra fall that closed the gap.

Third, the carrier was the attendant. Loudon found that English women attended by doctors, often the richer, died more often than the poor attended by midwives (THRIVING library, MA-01). Nightingale counted 34 deaths per 1,000 in lying-in institutions against 5.1 at home (THRIVING library, HY-01). Home birth is safer than a crowded

ward with a careless attendant, but no safer when the midwife goes from a septic woman to the next birth. The village attendant who delivers every baby in the valley is in Gordon's position.

12. Why deaths stayed high until 1936

If Semmelweis was right in 1847, why did English maternal mortality stay near 4.6 per 1,000 until 1936? Loudon's answer, as the library reads it, is that antisepsis spread slowly, home births by untrained attendants were out of reach of hospital reform, and the main killer, Streptococcus pyogenes (group A), was carried in attendants' throats and noses as well as on hands (THRIVING library, MA-01, HY-01, Loudon 1987, 2000) [VERIFY: Loudon's texts could not be read]. Dora Colebrook's 1935 report traced cases to attendants' noses and throats, and Leonard Colebrook pressed for masks and for chloroxylenol on the hands (Ellis 2011).

What changed in 1936 was a drug. At Queen Charlotte's Hospital, Colebrook and Kenny treated 38 women with severe puerperal fever with Prontosil and lost 3 (8 per cent), against about a quarter in earlier groups, and the next 25 all lived (THRIVING library, IN-04, Colebrook and Kenny 1936, Ellis 2011). Clean hands cut childbed fever where the attendant carries it. They did not end it. When the drugs are gone, the 1930s figures return for every infection clean hands do not prevent.

13. Puerperal sepsis without antibiotics

Puerperal sepsis is infection of the genital tract between the breaking of the waters or start of labour and the 42nd day after birth. The Sri Lankan guideline defines it by two or more of pelvic pain, fever of 38.5°C or more, abnormal discharge, foul smell, and a womb shrinking by less than 2 cm a day in the first 8 days (SLCOG). A WHO-based chart uses 38.0°C twice 4 hours apart, or 38.5°C once (GLOWM chart, secondary).

Gordon lost 36 per cent of his cases. Queen Charlotte's lost 18 to 29 per cent of severe cases in 1931 to 1934 (THRIVING library, IN-04). Those were severe cases. Milder endometritis often settled with rest, fluids and drainage of retained material [VERIFY: no figure found].

Group A streptococcus is the fastest killer. In 67 published cases of pregnancy-related group A infection, 85 per cent came after birth. Of 51 cases after birth, half began within 2 days, four within the first hour, and 72.5 per cent within 4 days. Fever was present in 73 to 86 per cent and abdominal pain in 54 to 71 per cent, but a fast pulse and high white count were often absent at first, and vomiting and diarrhoea were common. A quarter of women with onset in the first two days died, even in modern hospitals, and about 31 per cent lost the womb. Only 13.9 per cent of infections were acquired in hospital. The rest came from the woman, her family or the community (Hamilton, Stevens and Bryant 2013). Gordon's onset on the day after delivery and death by the fifth day fits group A. Later fever with foul lochia more often comes from mixed bowel bacteria and retained products [VERIFY: clinical teaching].

Other fevers after birth must be told apart: breast, bladder and kidney, wound, leg clot, malaria and typhoid. A soft, tender, large womb with foul or heavy lochia points to the womb.

14. The six cleans, kits, and the 80 per cent claim

WHO's six cleans are clean hands, perineum, delivery surface, blade, cord tie and cord care, with some versions differing in the last (secondary). In Mwanza, Tanzania, among 3,262 women, users of a clean delivery kit had 13.1 times lower odds of cord infection and 3.2 times lower odds of puerperal sepsis, and women who washed before delivery had 2.6 times lower odds of sepsis (Winani 2007). It was observational.

Other measures keep bacteria out of the womb: few vaginal examinations, none with unwashed hands, nothing inserted into the vagina, shorter labours through early referral (MA-03), and antibiotics at manual removal of the placenta, ampicillin 2 g or cefazolin 1 g with metronidazole 500 mg (THRIVING library, IN-04). An attendant

with a sore throat, a boil or a septic finger does not attend, or wears a mask and gloves if no one else can [OWNER]. HY-01's birth attendant protocol applies in full.

The book claims clean hands cut childbed fever by 80 per cent. In Vienna, 11.4 per cent in 1846 against 1.27 per cent in 1848 is a fall of about 89 per cent (THRIVING library, HY-01). The six-year average of 9.9 per cent against 3.0 per cent for 1847 to 1849, which includes months before washing, is a fall of about 70 per cent [VERIFY: my arithmetic]. But the unwashed Second Clinic fell 59 per cent over the same years. The chlorine effect is the difference.

So the claim holds for a hospital where doctors went from the dead-house to the labour ward. It is not a law for a village, where the attendant handles no corpses and many infections come from the woman's own bacteria after a long labour or from group A in the family. In Tanzania a bundle including washing went with about two-thirds lower odds of sepsis (Winani 2007). A fair statement is that clean hands and clean birth can cut childbed fever by half to more than four-fifths where attendants carry the infection, and by less where they do not [VERIFY: my synthesis]. As a general rule the 80 per cent figure is grade C.

15. Retained products

Retained placenta or membrane rots and feeds infection, and is the commonest reason a woman with fever does not improve. MA-02 covers retained placenta, with a case fatality up to 10 per cent (THRIVING library, MA-02). The signs are continued or heavy bleeding, foul lochia, a soft womb too large for the day, and an open cervix. MSF advises antibiotics, emptying the womb by manual exploration or digital curettage under anaesthesia or sedation, and a uterotonic: oxytocin 5 to 10 IU, methylergometrine 0.2 mg intramuscularly, or misoprostol 800 micrograms under the tongue (MSF 2019). Methylergometrine is not given where blood pressure is high. The infected womb is soft and perforates easily, and instrumental evacuation belongs to OR-04. In a village the step is antibiotics and carriage. Without antibiotics, removing retained material and draining pus were the only treatments that changed the outcome.

16. Salvaged antibiotics

IN-05 ranks amoxicillin first, gentamicin second and metronidazole fifth, and IN-04 gives WHO's first choice for endometritis, clindamycin with gentamicin (THRIVING library, IN-04, IN-05). This section adds the obstetric regimens.

MSF treats endometritis with amoxicillin and clavulanic acid 1 g intravenously every 8 hours plus gentamicin 5 mg/kg intramuscularly once a day, or ampicillin 2 g intravenously every 8 hours plus metronidazole 500 mg every 8 hours plus gentamicin. Treatment continues until 48 hours without fever, then oral amoxicillin and clavulanic acid 3 g a day, or amoxicillin 1 g with metronidazole 500 mg three times a day, to complete 5 days (MSF 2019). The Sri Lankan guideline gives a similar triple regimen followed by 4 to 7 days of oral treatment, and for a woman at home a first oral dose of 3 g of amoxicillin or ampicillin and referral (SLCOG). Its listed ampicillin dose of 500 mg every 6 hours looks low against MSF's 2 g, which should be preferred. The sources agree on the drugs and on 48 hours free of fever.

Clindamycin with gentamicin failed less often than penicillin regimens with poor anaerobic cover and than cephalosporins (ratio 0.69) (Mackeen 2015). Without clindamycin, metronidazole gives the anaerobic cover. Fever after 72 hours of treatment usually means something antibiotics cannot reach: retained products, abscess, an infected pelvic clot or a wound (SLCOG). For group A, modern practice adds clindamycin to penicillin to stop toxin production [VERIFY].

The A-PLUS trial gave a single oral 2 g dose of azithromycin to 29,278 women in labour in low- and middle-income countries. Maternal sepsis or death fell from 2.4 to 1.6 per cent (relative risk 0.67), driven by sepsis. Deaths were 0.1 per cent in both arms, and newborns did not benefit (Tita 2023). About 125 women are treated to prevent one sepsis [VERIFY: my arithmetic]. Whether to spend salvaged azithromycin this way is a village choice [OWNER]. This

report's view is that a small stock does more good kept for treatment and for women with a long labour, a manual removal or long-broken waters, which is untested.

Evidence grades

A: consistent randomised trials or their review. B: one good trial or strong consistent observational evidence. C: observational, historical or expert evidence with real doubt. D: tradition or anecdote only. X: harmful.

Practice	Tradition	Record	Inference	Grade
Magnesium for eclampsia	None before the 1920s	Fewer fits and deaths than diazepam, phenytoin, lytic cocktail		A
Magnesium for severe pre-eclampsia		Fits 1.9 to 0.8 per cent, number needed to treat 63	Give scarce stock here	A
Magnesium for mild pre-eclampsia		Number needed to treat 109	Poor use of scarce drug	B, low priority
Loading dose alone before transfer		WHO advises, Cochrane uncertain	Better than none on a long carry	C
Injectable magnesium made from Epsom salt	Book claim	Compounder and factory deaths, Nigerian fluids 36 per cent pyrogenic	Endotoxin margin almost nil	X
Oral Epsom salt for eclampsia		No trial	Purgative	X
Diazepam without magnesium	Hesperian	Worse than magnesium	Better than nothing	C
Lytic cocktail	Used into the 1990s	Death ratio 0.14 favouring magnesium		X
Veratrum	1860s to 1950s	Series only, toxic	Lookalike poisonings	X
Morphine and chloral sedation	Stroganoff	9.8 per cent mortality, uncontrolled		C
Knee jerk, breathing and urine watch, calcium antidote		WHO, Kano toxicity about 2 per cent	Cheap and enough	B
Low-dose aspirin for high risk		77 trials, ratio 0.82	Needs salvage	A
Willow bark instead of aspirin	Pain remedy	Weak platelet effect	Not a substitute	D, teach against
Calcium where diets are poor		Ratio 0.45, small-study bias		B
Eggshell calcium		Composition and safety study only	Same calcium as tablets	C

Practice	Tradition	Record	Inference	Grade
Garlic for pre-eclampsia	Folk use	One trial, no clear effect		D
Delivery as the cure	Old teaching	Parkland series		A for the principle
Clean hands of birth attendants	Gordon, Holmes, Semmelweis	Vienna 70 to 89 per cent fall, control clinic fell too	Effect depends on source	B
“80 per cent” as a general rule	Book claim	Holds only in Vienna-like settings	Smaller in villages	C
Clean delivery kit and six cleans		Sepsis odds 3.2 times lower, observational		B
Ampicillin or amoxicillin, gentamicin, metronidazole		MSF, SLCOG, Cochrane on regimens		B
Azithromycin 2 g in labour		Sepsis ratio 0.67, deaths unchanged	Spends a scarce drug	A for effect
Bleeding and purging for fever	Gordon	Self-reported only	Harmful in sepsis	X

Means ledger

Rung	Eclampsia and pre-eclampsia	Puerperal sepsis
Hands and knowledge	Ask about headache, vision, upper belly pain, swelling. Know fits come after birth too. Left side, airway, no restraint.	Washed hands, short nails, no attendant with a sore throat or septic finger, few vaginal examinations, nothing inserted. Feel the womb daily after birth. Know group A can start within hours.
Hearth	Heat and vinegar test for heavy protein. Eggshell calcium where diets are poor. Quiet, dark room.	Boiled water, clean cloth and birth surface, boiled or burnt soiled linen, soap or ash (HY-01).
Garden and still	No useful plant. Never Veratrum. Distilled water is not water for injection.	Ethanol handrub (HY-01). No plant treats sepsis.
Village dispensary (300)	Cuff checked against a second cuff, dipsticks while they last, a card per pregnancy with readings after 20 weeks and on days 1 to 3 after birth. Salvaged aspirin. If held: about 30 g magnesium 50 per cent, 2 ampoules calcium gluconate, lidocaine, syringes, reflex hammer [OWNER]. Rectal diazepam if no magnesium.	Clean delivery kits, thermometer, pulse watch, fever register by attendant. Oral amoxicillin and metronidazole for first doses. Rule to carry any woman with fever and a tender womb.

Rung	Eclampsia and pre-eclampsia	Puerperal sepsis
District infirmary (3,000)	Full intramuscular Pritchard regimen, catheter and hourly urine, calcium gluconate, salvaged nifedipine or hydralazine, induction and assisted birth (MA-03, OR-04). Stock for two to three courses a year, about 50 g each [VERIFY: my arithmetic].	Injectable ampicillin, gentamicin, metronidazole. Evacuation of retained products, drainage of abscesses, isolation of septic women, masks, records.
Hospital before the Fall (reference)	Pumps, blood magnesium levels, intensive care, caesarean, infused antihypertensives. Eclampsia deaths under 1 per cent.	Cultures, antibiotics within the hour, surgery, intensive care. Deaths rare.

Harm test

Magnesium sulfate: overdose (lost reflexes, slow breathing, cardiac arrest), flushing in a quarter, painful injections, abscess. The worst harms come from fast drips and from dosing a woman whose kidneys have failed. Calcium gluconate and a way to breathe for her must be at hand. Home-made injection adds infection, endotoxin shock and unknown strength. Withholding magnesium from a fitting woman multiplies her risk of death.

Diazepam: depresses breathing, especially after repeat doses or magnesium, and sedates the baby. Twice the further fits of magnesium.

Antihypertensives: too fast a fall starves the baby.

Aspirin: small bleeding risk, which matters more where haemorrhage cannot be treated [VERIFY: not quantified]. Stop at 36 weeks as in ASPRE.

Calcium and eggshell: Salmonella from badly treated shell, sharp fragments, more HELLP in the Cochrane review, and reduced iron absorption if taken with iron [VERIFY].

Antibiotics: penicillin allergy can kill. Gentamicin harms ear and kidney (THRIVING library, IN-04). Azithromycin for every woman spends stock and breeds resistance.

The attendant: the largest harm in this field is an attendant who carries infection from woman to woman. Gordon is the record of it.

Red flags

Act within the hour if a pregnant woman or new mother has:

1. A fit, at any time in pregnancy or up to six weeks after birth.
2. Blood pressure 160/110 or more.
3. 140/90 or more with headache, disturbed vision, upper belly pain or vomiting.
4. Sudden swelling of face and hands with little urine.
5. On magnesium: breathing under 12 or no knee jerk. Stop magnesium, give calcium.
6. Fever of 38.0°C twice 4 hours apart, or 38.5°C once, after the waters break or after birth.
7. Fever, belly pain, vomiting or diarrhoea in the first two days after birth, even without a foul smell. Think of group A.
8. Pulse over 100 with cold hands, confusion or fainting after birth.

9. Foul lochia, or a soft, tender womb that is not shrinking.
10. Fever not settled after 72 hours of antibiotics.
11. A second fever after birth among the same attendant's women within weeks. Stand her down (HY-01).

The case against

Magnesium's mortality benefit in pre-eclampsia is not proven. Magpie's death ratio was 0.55 with an interval from 0.26 to 1.14, and Roberts, Villar and Arulkumaran pointed out that over 100 women with non-severe disease must be treated to prevent one fit (Magpie 2002, Roberts, Villar and Arulkumaran 2002). A village that injects every woman with raised pressure exposes many to injection for small gain. This report therefore confines magnesium to severe disease and eclampsia.

Magnesium also needs watching that a lone healer at night may not manage. The answer is the intramuscular route, the knee jerk and calcium, but the objection is real.

Against the Semmelweis story, Loudon argued that hand antisepsis did not by itself lower national maternal mortality, which stayed flat until the sulphonamides, and that the Semmelweis myth misleads about how childbed fever was beaten (Loudon 1986, 2000, via MA-01 and HY-01). The fall in the unwashed Second Clinic supports part of this.

Against calcium, the Cochrane authors warn that the effect sits in small trials (Hofmeyr 2018), and Magee and von Dadelszen criticised the low-dose non-inferiority trials (secondary, not read) [VERIFY].

Against blaming hospitals, Högberg argued that trained community midwives kept Swedish maternal mortality low long before antibiotics (Högberg 2004, not read) [VERIFY]. That supports the village midwife, but only a trained and clean one. Against home birth stands Gordon, whose epidemic was in homes.

10-line summary

1. Before antibiotics sepsis killed about half the mothers who died, and eclampsia killed one in five to one in three women who fitted.
2. Magnesium sulfate halves further fits against diazepam and is graded A.
3. Pritchard's regimen (4 g IV plus 10 g IM, then 5 g IM every 4 hours) suits a district without drips.
4. Before every dose: knee jerk present, breathing 16 or more, urine 30 mL an hour. Calcium gluconate 1 g at hand.
5. Injectable magnesium cannot be made safely from Epsom salt outside a pharmaceutical plant. Graded X.
6. Delivery is the only cure. No plant prevents or treats pre-eclampsia, and Veratrum kills.
7. Low-dose aspirin for high-risk women and calcium where diets are poor prevent some pre-eclampsia. Eggshell can supply the calcium.
8. Childbed fever is carried by attendants, at home as in hospital. Gordon could name the next victim by her midwife.
9. Vienna's fall of 70 to 89 per cent came with a fall in the unwashed clinic too. The 80 per cent figure is no law for villages.
10. Group A sepsis can start within hours and look like a stomach upset. Treat at once and remove retained products.

Open questions

- How accurate is the heat test for urine protein in pregnancy?
- What was nineteenth-century eclampsia mortality without sedation? The early series could not be read.
- How safe is a loading dose alone followed by a long carry?
- Is there any record of non-pharmaceutical injectable magnesium with a measured outcome? None found.

- Azithromycin in labour or kept for treatment?
- What share of village childbed fever will come from attendants' hands rather than the woman's own bacteria or group A at home?
- What strength of chloride of lime did Semmelweis use? Not found.
- Antihypertensive doses from two independent primary sources.
- Do the CRADLE trials of simple blood pressure devices change the village rule? Not read.

Sources to read in full

- WHO, Managing Complications in Pregnancy and Childbirth, eclampsia and puerperal fever chapters. Blocked.
- Loudon 2000 and Loudon 1987.
- Pritchard 1955 and Pritchard, Cunningham and Pritchard 1984.
- The full Collaborative Eclampsia Trial and Magpie papers, for toxicity tables.
- Hesperian, A Book for Midwives, pre-eclampsia chapter.
- Colebrook and Kenny 1936, and Dora Colebrook's 1935 MRC report.
- Högberg 2004.
- The CRADLE trials.

At the bedside after the Fall

A woman of 24, eight months into her first pregnancy, comes at dusk with a headache she cannot shake and spots before her eyes. Her face is puffy. The healer seats her, rests her arm on the table and reads 164/112, then 158/110 ten minutes later. A heated tube of her urine clouds and stays cloudy after vinegar.

This is severe pre-eclampsia. The healer sends a runner to the district and opens the magnesium box. She lays the woman on her left side, writes the time, and gives 5 g of 50 per cent magnesium sulfate into each buttock with lidocaine in the syringe. She counts breathing (18), checks the knee jerks (present), and measures the urine. She writes all three down. When the cart comes she rides with the woman, carrying calcium gluconate, a syringe and the bag and mask. At the district her labour is started, and two days after the birth her pressure is falling.

Six days later another woman, delivered at home by the village attendant after a two-day labour, has a temperature of 38.6°C, a pulse of 112 and foul lochia, and her womb is soft and tender at the navel. The attendant gives amoxicillin 1 g and metronidazole 500 mg by mouth, writes the fever in the register under her own name, and sends the woman to the district for gentamicin and a hand to feel for retained placenta. She attends no birth until she has washed, changed and spoken to the healer. The register is how Gordon would have caught himself.

Protocols

Protocol 1. Screening for pre-eclampsia

- Blood pressure at every visit after 20 weeks and on days 1, 2 and 3 after birth [OWNER: frequency].
- Seated, arm at heart level, right cuff size, after 5 minutes rest [VERIFY].
- 140/90 or more: recheck within 4 hours (MA-01), test urine, ask about symptoms.
- 150/110 or more, or 140/90 with any symptom: urgent referral (MA-01).
- 160/110 or more, or any fit: Protocol 2.
- Protein: dipstick 1+ or more, or a cloud that stays after heat and vinegar.
- Write every reading on the woman's card and in the register.

Protocol 2. Magnesium sulfate, intramuscular (Pritchard)

- For eclampsia, or severe pre-eclampsia (160/110 or more with protein or symptoms) [OWNER].

- First: breathing 16 or more, knee jerks present, calcium gluconate 10 per cent, 10 mL, at hand.
- Loading: if a vein is open, 4 g intravenously over 5 to 15 minutes, diluted to 20 per cent or less (WHO PQ RH063).
- Plus 10 g of 50 per cent, 5 g (10 mL) deep into each upper outer buttock, each with 1 mL of 2 per cent lidocaine.
- No vein: the 10 g intramuscular dose alone (Hesperian NWTND).
- Fit again after 15 minutes: 2 g intravenously over 5 minutes.
- Maintenance: 5 g of 50 per cent into alternate buttocks every 4 hours.
- Before each: breathing 16 or more, knee jerks present, urine at least 30 mL an hour over 4 hours (120 mL). If not, delay and recheck hourly.
- Continue 24 hours after birth or last fit, whichever is later.
- Tolerances: never more than 5 g per maintenance dose, never 50 per cent into a vein.
- Stock per course: 50 to 55 g magnesium sulfate, 2 calcium gluconate ampoules, lidocaine, 10 mL syringes, long needles [VERIFY: my arithmetic].

Protocol 3. Magnesium overdose

- Signs: no knee jerk, breathing under 12, drowsiness, low blood pressure, slow or irregular pulse.
- Stop magnesium.
- Breathing under 12: calcium gluconate 1 g (10 mL of 10 per cent) intravenously over 3 minutes (WHO PQ RH063). ME-08 allows up to 2 g.
- Breathe for her with bag and mask until her own rate is over 12.
- Restart only when the knee jerk returns, at a longer interval [VERIFY: restart rule not in the sources read].

Protocol 4. A woman who is fitting

- Call for help, note the time.
- Protect from injury, no restraint, nothing in the mouth.
- After the fit, left side, clear airway.
- Magnesium loading dose (Protocol 2) at once.
- No magnesium: diazepam 20 mg rectally, plus 10 mg after 10 minutes if fits continue, no more than 2 doses. Watch breathing.
- Blood pressure. If 160/110 or more, a salvaged antihypertensive [VERIFY: dose].
- Catheter if available, urine hourly. Check the baby's heart.
- Plan delivery once stable. Carry to the district with the loading dose given.
- Watch for 48 hours after birth.

Protocol 5. Prevention

- At the first visit, mark high risk: previous pre-eclampsia, chronic hypertension, kidney disease, diabetes, autoimmune disease, twins [VERIFY].
- Salvaged aspirin: 75 to 150 mg at night, from 12 weeks (before 20) to 36 weeks [OWNER: dose by stock].
- Calcium where diets lack milk, cheese or bony fish: 500 mg to 1 g a day from 20 weeks to birth.
- Eggshell: boil 10 minutes, dry, grind fine, cook into food 20 minutes. About 1.3 g of shell per 500 mg calcium. Weigh until the scoop is known.
- Take calcium at a different meal from iron [VERIFY].

Protocol 6. Clean birth (adds to HY-01)

- Six cleans: hands, perineum, surface, blade, cord tie, cord care.
- Mother washes or is washed before delivery.

- Attendant with sore throat, skin infection or septic finger stands aside, or masks and gloves if no one else can [OWNER].
- No birth straight after a septic woman, a corpse, a wound or a slaughtered animal. HY-01's 24-hour rule.
- Fewest possible vaginal examinations. Nothing inserted.
- Burn or boil soiled linen.
- Record every fever after birth under the attendant's name. Two in a month: HY-01 stand-down.

Protocol 7. Fever after birth

- Temperature twice daily for 3 days after birth, and whenever she feels ill.
- 38.0°C twice 4 hours apart, 38.5°C once, or fever with a tender womb or foul lochia: treat as puerperal sepsis.
- Check pulse, breathing, pressure, breasts, legs, urine, wounds, and womb size and tenderness.
- Village: amoxicillin 1 g with metronidazole 500 mg by mouth at once, or 3 g amoxicillin as SLCOG advises. Carry to the district.
- District: ampicillin 2 g IV every 6 to 8 hours or amoxicillin and clavulanic acid 1 g IV every 8 hours, with gentamicin 5 mg/kg IM daily and metronidazole 500 mg IV every 8 hours (MSF 2019, SLCOG).
- Until 48 hours without fever, then oral amoxicillin 1 g and metronidazole 500 mg three times daily to complete 5 to 7 days.
- Not better at 72 hours: look for retained products, abscess, wound, clot.
- Retained products: antibiotics first, evacuation by a trained hand, then oxytocin 5 to 10 IU (MSF 2019).
- Onset within 48 hours with belly pain, vomiting or diarrhoea: treat as group A, do not wait for foul lochia, isolate from other mothers, watch baby and attendant.

Numbers to carry

- Pre-eclampsia 3 to 8 per cent of births. Hypertensive disorders 14 to 16 per cent of maternal deaths.
- 140/90 recheck, 150/110 urgent, 160/110 severe.
- Eclampsia without effective treatment: 20 to 30 per cent deaths. Sedation: about 10. Kano with magnesium: 2.3.
- Magnesium against diazepam: half the further fits.
- Magpie: fits 1.9 to 0.8 per cent. Number needed to treat 63 severe, 109 non-severe.
- Pritchard: 4 g IV plus 10 g IM, then 5 g IM every 4 hours, 24 hours after birth or last fit.
- Zuspan: 4 g IV, then 1 g an hour.
- Checks: knee jerk, breathing 16, urine 30 mL an hour.
- Calcium gluconate 1 g IV over 3 minutes.
- Endotoxin limit 0.09 units per mg: a 4 g dose at the limit is 360 units, about the fever threshold.
- Aspirin 75 to 150 mg nightly, before 20 weeks to 36. Ratio 0.82.
- Calcium 500 mg to 1 g a day. Eggshell about 380 mg calcium per gram.
- Gordon: 28 deaths in 77 (36 per cent).
- Vienna First Clinic 9.9 to 3.0 per cent, Second Clinic 3.9 to 1.6 per cent.
- Severe puerperal sepsis before antibiotics: about one in four died.
- Group A after birth: half begin within 2 days. A quarter of early cases die even now.
- Antibiotics until 48 hours without fever. Review at 72 hours.
- Azithromycin 2 g in labour: sepsis 2.4 to 1.6 per cent.

References

Library reports cited: THRIVING library HY-01, IN-04, IN-05, MA-01, MA-02, ME-08, MA-03.

1. Say L, Chou D, Gemmill A, and others. 2014. Global causes of maternal death: a WHO systematic analysis. Lancet Global Health 2(6): e323-e333. Abstract only. https://doi.org/10.1016/S2214-109X(14)70227-X
2. World Health Organization. 2026. Pre-eclampsia. Fact sheet, 6 October 2026. Read in full. https://www.who.int/news-room/fact-sheets/detail/pre-eclampsia
3. Duley L. 2009. The global impact of pre-eclampsia and eclampsia. Seminars in Perinatology 33(3): 130-137. Abstract only. https://pubmed.ncbi.nlm.nih.gov/19464502/
4. Loudon I. 1986. Deaths in childbed from the eighteenth century to 1935. Medical History 30: 1-41. Not read directly, used through MA-01. https://www.cambridge.org/core/journals/medical-history/article/deaths-in-childbed-from-the-eighteenth-century-to-1935/2062B63FD4468574FDB3CD2C1A548241
5. WHO GLOSS Research Group. 2020. Frequency and management of maternal infection in health facilities in 52 countries (GLOSS). Lancet Global Health 8: e661-e671. Secondary, WHO news summary. https://www.who.int/news/item/27-04-2020-maternal-infections-in-health-facilities
6. Hesperian. New Where There Is No Doctor: Medicines for severe pre-eclampsia and seizures. Read in full. https://en.hesperian.org/hhg/New_Where_There_Is_No_Doctor:Medicines_for_Severe_Pre-eclampsia_and_Seizures:_Pregnancy_and_Birth
7. Teeuw HM and others. 2022. Diagnostic accuracy of urine dipstick tests for proteinuria in pregnancy: a systematic review and meta-analysis. Secondary, repository record and search summary. https://researchinformation.umcutrecht.nl/en/publications/diagnostic-accuracy-of-urine-dipstick-tests-for-proteinuria-in-pr/
8. Walker HK, Hall WD, Hurst JW, editors. 1990. Clinical Methods: The History, Physical, and Laboratory Examinations, third edition. Butterworths. Chapter on urinalysis. Secondary, search summary. https://www.ncbi.nlm.nih.gov/books/NBK705/
9. Billah SM, Khan ANS, Rokonuzzaman SM, and others. 2021. Competency of health workers in detecting and managing gestational hypertension, pre-eclampsia and severe pre-eclampsia during antenatal care checkups in primary health care facilities in Bangladesh. BMJ Open 11(7): e046638. Abstract only. https://bmjopen.bmj.com/content/11/7/e046638
10. Boene H, Vidler M, Augusto O, and others. 2016. Community perceptions of pre-eclampsia and eclampsia in southern Mozambique. Reproductive Health 13(Suppl 1). Abstract and search summary. https://pmc.ncbi.nlm.nih.gov/articles/PMC4943502
11. Temple. 1930. Notes on the treatment of eclampsia. Bristol Medico-Chirurgical Journal 47: 307. Read only as a search summary, author details not confirmed. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5046813/
12. Bryant RD, Fleming JG. 1940. Veratrum viride in the treatment of eclampsia. Journal of the American Medical Association. Not read, figures from a search summary. No stable URL found.
13. Garnier R, Carlier P, Hoffelt J, Savidan A. 1985. Intoxication aiguë alimentaire par l'ellébore blanc (Veratrum album L.). Annales de Médecine Interne. Secondary, via a toxicology blog summary. https://naturespoisons.com/2018/05/22/mistaken-identity-gentiana-lutea-veratrum-album/
14. Wikipedia contributors. Veratrum album. Accessed 10 October 2026. Secondary. https://en.wikipedia.org/wiki/Veratrum_album
15. Duley L, Gülmezoglu AM, Chou D. 2010. Magnesium sulphate versus lytic cocktail for eclampsia. Cochrane Database of Systematic Reviews, CD002960.pub2. Abstract only. https://www.cochrane.org/CD002960
16. Pritchard JA, Cunningham FG, Pritchard SA. 1984. The Parkland Memorial Hospital protocol for treatment of eclampsia: evaluation of 245 cases. American Journal of Obstetrics and Gynecology 148(7): 951-963. Abstract only. https://utsouthwestern.elsevierpure.com/en/publications/the-parkland-memorial-hospital-protocol-for-treatment-of-eclampsi
17. Pritchard JA. 1955. The use of the magnesium ion in the management of eclamptogenic toxemias. Surgery, Gynecology and Obstetrics 100: 131-140. Not read. No stable URL found.
18. Zuspan FP. 1966. Treatment of severe preeclampsia and eclampsia. Clinical Obstetrics and Gynecology 9: 954-972. Not read. No stable URL found.

19. Eclampsia Trial Collaborative Group. 1995. Which anticonvulsant for women with eclampsia? Evidence from the Collaborative Eclampsia Trial. Lancet 1995, 345:1455. Abstract only. https://pubmed.ncbi.nlm.nih.gov/7769899/
20. Duley L, Henderson-Smart DJ, Walker GJA, Chou D. 2010. Magnesium sulphate versus diazepam for eclampsia. Cochrane Database of Systematic Reviews, CD000127.pub2. Abstract only. https://www.cochrane.org/CD000127
21. Duley L, Henderson-Smart DJ, Chou D. 2010. Magnesium sulphate versus phenytoin for eclampsia. Cochrane Database of Systematic Reviews, CD000128.pub2. Abstract only. https://read.qxmd.com/read/20927719/magnesium-sulphate-versus-phenytoin-for-eclampsia
22. Magpie Trial Collaborative Group. 2002. Do women with pre-eclampsia, and their babies, benefit from magnesium sulphate? The Magpie Trial: a randomised placebo-controlled trial. Lancet 2002, 359:1877. Abstract and summary only. https://www.rhsupplies.org/activities-resources/publications/medical-journal-do-women-with-pre-eclampsia-and-their-babies-benefit-from-magnesium-sulphate-the-magpie-trial-6379/
23. Roberts JM, Villar J, Arulkumaran S. 2002. Preventing and treating eclamptic seizures. BMJ 2002, 325:609. Search summary. https://www.bmj.com/content/325/7365/609
24. Okereke E, Ahonsi B, Tukur J, Ishaku SM, Oginni AB. 2012. Benefits of using magnesium sulphate (MgSO4) for eclampsia management and maternal mortality reduction: lessons from Kano State in Northern Nigeria. BMC Research Notes 5: 421. Read in full. https://pmc.ncbi.nlm.nih.gov/articles/PMC3477064/
25. World Health Organization Prequalification. Magnesium sulfate 500 mg/mL solution for injection (RH063, Kalceks), product information, part 4. Read in full. https://extranet.who.int/prequal/sites/default/files/whopar_files/RH063part4.pdf
26. World Health Organization Prequalification. Magnesium sulfate injection (RH062), product information, part 4. Read through ME-08. https://extranet.who.int/prequal/sites/default/files/whopar_files/RH062%20part4v2.pdf
27. Diaz V, Long Q, Oladapo OT. 2023. Alternative magnesium sulfate regimens for women with pre-eclampsia and eclampsia. Cochrane Database of Systematic Reviews, CD007388.pub3. Abstract only. https://www.cochrane.org/CD007388
28. United States Pharmacopeial Convention. USP 35. Magnesium Sulfate Injection, monograph. Read in full via a transcription. https://www.drugfuture.com/Pharmacopoeia/USP35/data/v35300/usp35nf30s0_m47060.html
29. Associates of Cape Cod (ACC). 2017. Endotoxin limits. White paper. Secondary. https://www.acciusa.com/pdfs/whitepapers/EndotoxinLimits_SeanJH-PR17-012.pdf
30. Meers PD, Calder MW, Mazhar MM, Lawrie GM. 1973. Intravenous infusion of contaminated dextrose solution: the Devonport incident. Lancet 1973, 2:1189. Abstract only. https://scholars.houstonmethodist.org/en/publications/intravenous-infusion-of-contaminated-dextrose-solution-the-devonp/
31. Atata RF, Ibrahim YKE, Akanbi AA, and others. 2007. Microbiological quality of some brands of intravenous fluids produced in Nigeria. African Journal of Biotechnology. Abstract only. https://uilspace.unilorin.edu.ng/items/0631fe2b-9079-489f-bd23-f87169f0f897/full
32. Simpson KR, Knox GE. 2004, as reported by Relias Media. Common sense prevents IV magnesium mistakes. Secondary. https://www.reliasmedia.com/articles/59829-common-sense-prevents-iv-magnesium-mistakes
33. World Health Organization. 2011. WHO recommendations for prevention and treatment of pre-eclampsia and eclampsia. Geneva: WHO. Not read in full, used through search summaries. https://www.who.int/publications/i/item/9789241548335
34. American College of Obstetricians and Gynecologists. 2019. Committee Opinion 767: Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period. Secondary, news summary. https://mdedge.com/content/acog-outlines-new-treatment-options-hypertensive-emergencies-pregnancy
35. Duley L, Meher S, Hunter KE, Seidler AL, Askie LM. 2019. Antiplatelet agents for preventing pre-eclampsia and its complications. Cochrane Database of Systematic Reviews, CD004659.pub3. Abstract only.

https://www.cochrane.org/CD004659
36. Rolnik DL, Wright D, Poon LC, and others. 2017. Aspirin versus placebo in pregnancies at high risk for preterm preeclampsia. New England Journal of Medicine 377: 613-622. Read in part. https://www.ucl.ac.uk/comprehensive-clinical-trials-unit/sites/comprehensive_clinical_trials_unit/files/aspre_publication_nejm_17aug2017.pdf
37. National Institute for Health and Care Research. 2019. Aspirin reduces a woman's chance of developing pre-eclampsia in pregnancy. NIHR Evidence alert. Read in full. https://evidence.nihr.ac.uk/alert/aspirin-reduces-a-womans-chance-of-developing-pre-eclampsia-in-pregnancy
38. Krivoy N, Pavlotzky E, Chrubasik S, Eisenberg E, Brook G. 2001. Effect of salicis cortex extract on human platelet aggregation. Planta Medica 67(3): 209-212. Abstract only. https://www.thieme-connect.de/products/ejournals/abstract/10.1055/s-2001-12000
39. Hofmeyr GJ, Lawrie TA, Atallah AN, Torloni MR. 2018. Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems. Cochrane Database of Systematic Reviews, CD001059.pub5. Abstract only. https://pubmed.ncbi.nlm.nih.gov/30277579/
40. Dwarkanath P, Muhihi A, Sudfeld CR, and others. 2024. Two randomized trials of low-dose calcium supplementation in pregnancy. New England Journal of Medicine 390. Secondary, Harvard summary. https://www.hks.harvard.edu/centers/cid/publications/two-randomized-trials-low-dose-calcium-supplementation-pregnancy
41. Bartter J, Diffey H, Yeung YH, and others. 2018. Use of chicken eggshell to improve dietary calcium intake in rural sub-Saharan Africa. Maternal and Child Nutrition 14(S3): e12649. Abstract and search summary. https://pmc.ncbi.nlm.nih.gov/articles/PMC6221107/
42. Meher S, Duley L. 2006. Garlic for preventing pre-eclampsia and its complications. Cochrane Database of Systematic Reviews, CD006065. Summary only. https://www.cochrane.org/evidence/CD006065_garlic-preventing-pre-eclampsia-and-its-complications
43. Gordon A. 1795. A Treatise on the Epidemic Puerperal Fever of Aberdeen. London: G. G. and J. Robinson. Read in full, digitised text. https://archive.org/download/treatiseonepidem00gord/treatiseonepidem00gord_djvu.txt
44. Semmelweis IP. 1861. Die Ätiologie, der Begriff und die Prophylaxis des Kindbettfiebers. Translated by K. Codell Carter 1983. Tables read through Wikipedia, Historical mortality rates of puerperal fever, accessed 10 October 2026. Secondary. https://en.wikipedia.org/wiki/Historical_mortality_rates_of_puerperal_fever
45. Loudon I. 1987. Puerperal fever, the streptococcus, and the sulphonamides, 1911-1945. BMJ 1987, 295:485. Not read. https://doi.org/10.1136/bmj.295.6596.485
46. Loudon I. 2000. The Tragedy of Childbed Fever. Oxford: Oxford University Press. Publisher's description only. https://academic.oup.com/book/3556
47. Ellis H. 2011. Leonard Colebrook and puerperal fever. British Journal of Hospital Medicine 72(2): 109. Read in full. https://storage.imrpress.com/IMR/hmed/application/10.12968/hmed.2011.72.2.109.pdf
48. Colebrook L, Kenny M. 1936. Treatment of human puerperal infections, and of experimental infections in mice, with Prontosil. Lancet 1936, 1:1279. Secondary, James Lind Library record. https://www.jameslindlibrary.org/colebrook-l-kenny-m-1936/
49. Hamilton SM, Stevens DL, Bryant AE. 2013. Pregnancy-related group A streptococcal infections: temporal relationships between bacterial acquisition, infection onset, clinical findings, and outcome. Clinical Infectious Diseases 57(6): 870-876. Abstract and summary. https://pmc.ncbi.nlm.nih.gov/articles/PMC3749745
50. Sri Lanka College of Obstetricians and Gynaecologists. Management of puerperal sepsis. National guideline, year not stated. Read in full. https://www.gfmer.ch/SRH-Course-2010/national-guidelines/pdf/Management-Puerperal-Sepsis-SLCOG.pdf
51. Global Library of Women's Medicine. Maternal sepsis wall chart. Secondary. https://beta.glowm.com/pdf/Maternal_Sepsis_WallChart_WEB.pdf
52. Médecins Sans Frontières. 2019. Essential Obstetric and Newborn Care, section 8.3, Late postpartum

haemorrhage. Read in full. https://medicalguidelines.msf.org/viewport/ONC/english/8-3-late-postpartum-haemorrhage-51417798.html

53. Mackeen AD, Packard RE, Ota E, Speer L. 2015. Antibiotic regimens for postpartum endometritis. Cochrane Database of Systematic Reviews, CD001067.pub3. Summary only. https://www.cochrane.org/CD001067/PREG_antibiotic-regimens-postpartum-endometritis
54. Tita ATN, Carlo WA, McClure EM, and others. 2023. Azithromycin to prevent sepsis or death in women planning a vaginal birth. New England Journal of Medicine 388: 1161-1170. Search summary. https://doi.org/10.1056/NEJMoa2212111
55. Winani S, Wood S, Coffey P, Chirwa T, Mosha F, Changalucha J. 2007. Use of a clean delivery kit and factors associated with cord infection and puerperal sepsis in Mwanza, Tanzania. Journal of Midwifery and Women's Health 52(1): 37-43. Summary only. https://www.path.org/our-impact/resources/evaluation-of-a-clean-delivery-kit-intervention-in-preventing-cord-infection-and-puerperal-sepsis-in-mwanza-tanzania/
56. Högberg U. 2004. The decline in maternal mortality in Sweden: the role of community midwifery. American Journal of Public Health 94(8): 1312-1320. Not read. https://doi.org/10.2105/AJPH.94.8.1312