MI-09 Sleep, rest and the nervous system: the oldest medicine

HEALING after the FALL, research library, MI-09

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

Scope and the short answer

This report asks what sleep heals, what rest heals, which treatments for sleeplessness work when there is no pharmacy, and which sleeping draughts kill. It builds on the library and does not repeat it. MI-04 owns depression and anxiety, morning light and the evidence that insomnia predicts depression. PH-01 owns the plant monographs. MI-06 and ME-09 own the benzodiazepines, the Z-drugs and phenobarbital, with their doses, equivalents and withdrawal. ME-05 owns opium and laudanum. NU-03 owns the sickroom and its night watch, and NU-01 and NU-04 own the case against bed rest. MI-01 owns the first weeks after trauma. Suicide belongs to MI-08 and is not covered here. MI-04 says in its scope line that suicide beyond screening "belongs to MI-09". That is an error in MI-04, and a reader following it should go to MI-08 (THRIVING library, MI-04, MI-08).

The short answer. Pre-industrial people did not all sleep in two shifts, but long dark nights can split anyone's sleep, so a waking at two in the morning in winter is not a disease. Short sleep raises the risk of infection and slows a wound by about a day in experiments, which makes sleep worth protecting in the sick but does not make it a cure. The best treatment for chronic sleeplessness is behavioural, and its strongest parts (a fixed rising time, a shortened time in bed, leaving the bed when awake) can be taught by a lay person in four short sessions. The sedative plants are gentle and mostly fail in trials. Alcohol and opium work on the first night and harm by the tenth.

1. Did our ancestors sleep twice, and does it matter?

What the tradition says. The historian A. Roger Ekirch argues that before artificial light Europeans normally slept in two bouts, a "first sleep" from about nine or ten until around midnight, then a waking of up to an hour, then a "second sleep" until dawn (Ekirch 2005). In the waking people prayed, tended the fire, made love, visited neighbours or reflected on dreams. Ekirch reports about 2,000 textual references, including at least 18 medical texts of the seventeenth and eighteenth centuries, and finds the pattern outside Europe, for example in André Thevet's 1555 account of the Tupinamba of Brazil and an 1895 account of the Woolwa of Central America (Ekirch 2024). The waking was thought normal until doctors called it a disorder in the late nineteenth century. I have not read *At Day's Close* itself and rely on Ekirch's 2024 summary.

What the record shows. Three kinds of evidence test the thesis.

The first is an experiment. Thomas Wehr at the United States National Institute of Mental Health moved a small group of healthy volunteers from a 16-hour day to a 10-hour day, so that they spent 14 hours each night in darkness. Their sleep expanded and usually split into two bouts with a waking of one to three hours between, and nightly melatonin secretion lengthened (Wehr 1992). The abstract gives no sample size, and secondary accounts say the pattern took about four weeks to appear [VERIFY].

The second is fieldwork. Gandhi Yetish, Hillard Kaplan, Michael Gurven and colleagues recorded sleep by wrist actigraphy among the Hadza of Tanzania, the San of Namibia and the Tsimane of Bolivia, three peoples without electricity, over 1,165 days (Yetish 2015). They slept 5.7 to 7.1 hours within a sleep period of 6.9 to 8.5 hours, no longer than industrial populations. Sleep began on average 3.3 hours after sunset (range 2.5 to 4.4) and ended usually before sunrise, timed more by the evening fall in temperature than by light. Winter sleep was about an hour longer (56 minutes among the Tsimane, 53 among the San). Naps were taken on fewer than 7 per cent of winter days and 22 per cent of summer days, averaging 32 minutes. They did not regularly wake for long periods in the night, so there was no second sleep. Neither the San nor the Tsimane has a word for insomnia, and chronic insomnia was reported by only 1.5 per cent (trouble falling asleep) and 2.5 per cent (trouble staying asleep), against 10 to 30 per cent in industrial societies.

But David Samson and colleagues found the opposite among Malagasy farmers in a village without electricity. In 21 people over 292 days, sleep averaged 6.5 hours, naps were taken on 89 per cent of days, a peak of activity after midnight appeared on 49 per cent of nights, and polysomnography showed a sleep efficiency of only 66 per cent with 162 minutes awake after first falling asleep (Samson 2017). The authors called this segmented sleep.

The third is the archive. Gerrit Verhoeven read witness statements in the criminal court of Antwerp between 1715 and 1795 and found mostly single, unbroken sleep, little napping and fewer hours than expected (Verhoeven 2021). Natalie Boyce re-read the English sources and argued that many references to "first sleep" mean simply the early part of the night rather than a distinct bout (Boyce 2023). I know Boyce's paper only through Ekirch's reply, in which he defends the thesis and concedes that Wehr's laboratory was not an ideal model of the pre-industrial bedroom (Ekirch 2024).

What science infers. Segmented sleep is real but conditional. It appears when people spend far longer in the dark than they can sleep, as in Wehr's 14-hour nights or a northern winter without lamps. It is not the universal human pattern, and the foragers, who go to bed late and rise early, sleep in one block. Early modern households certainly worried about sleeplessness, because Hannah Fletcher and Sarah Handley found at least one sleep recipe in 80 per cent of 50 English household recipe books from 1650 to 1750, and smell (crushed aniseed, rosewater) was the main remedy (Fletcher and Handley 2026).

Why it matters after the Fall. In a northern village without electric light, winter nights will run to 14 or 16 hours. People who go to bed at dark will wake around midnight and should be told beforehand that this is normal. A waking that ends in sleep again, in a person well by day, needs no treatment. The trouble comes when people lie in bed for 12 hours and sleep for six, the condition that sleep restriction corrects (section 4). The forager data suggest the rule: bed some hours after dark, when sleepy, and a fixed rising time [VERIFY: my inference, untested after a collapse].

2. What sleep does for infection and wounds

Almost every tradition says sleep heals. The record supports a narrower claim, that short sleep weakens defence against infection and slows repair.

Colds. Sheldon Cohen's group measured sleep, then gave healthy adults rhinovirus nasal drops in quarantine. In 153 adults with a 14-day sleep diary, those sleeping under 7 hours were 2.94 times as likely to develop a cold (95% confidence interval 1.18 to 7.30) as those sleeping 8 hours or more, and those with sleep efficiency under 92 per cent were 5.50 times as likely (2.08 to 14.48) as those at 98 per cent or more. Feeling rested made no difference (Cohen 2009). In 164 adults measured by actigraphy for 7 days, those sleeping under 5 hours had odds of a cold of 4.50 (1.08 to 18.69) and those sleeping 5 to 6 hours 4.24 (1.08 to 16.71), against more than 7 hours, while 6 to 7 hours carried no clear excess (1.66, 0.40 to 6.95). Here fragmentation did not matter (Prather 2015). The two studies agree on duration and disagree on broken sleep.

Vaccines. Karine Spiegel and colleagues pooled studies of antibody response. When sleep was measured objectively, short sleep around the time of vaccination reduced the response by an effect size of 0.79 (0.40 to 1.18, 304 people).

When it was self-reported, the effect was 0.29 and not significant (504 people). The effect was clearer in men (0.93) than in women (0.42, not significant) (Spiegel 2023).

Wounds. Tracey Smith and colleagues at the United States Army research institute made small suction blisters on the forearms of healthy volunteers. After 72 hours of sleep restricted to 2 hours a night, the skin barrier took 5.0 ± 0.9 days to recover, against 4.2 ± 0.9 days with normal sleep (P = 0.02) (Smith 2018). In a second trial in 20 sleep-restricted volunteers, extra protein at 1.5 g/kg a day with a multinutrient drink shortened healing to a median of 3.98 days, against 5.25 days on placebo (Smith 2022). In 110 patients after emergency laparotomy in India, poor sleep after the operation went with poorer wound healing, but the study was observational (Das 2025).

What this means. The effects are real and modest. Sleep under 6 hours roughly quadruples the odds of a cold in a challenge study, and three nights of near-total deprivation delay a small wound by under a day, which food partly offsets. No study shows that extra sleep speeds healing. Sleep is one cheap support of recovery, like food and warmth, and matters most for the wounded, the post-partum and the old. NU-01 found that multicomponent delirium prevention with protected sleep as one part cut delirium in older patients from 15.0 to 9.9 per cent (THRIVING library, NU-01, NU-03). The usual adult need is 7 to 9 hours, 7 to 8 over 65, 8 to 10 for teenagers and 9 to 11 for school children (Hirshkowitz 2015).

3. Sleeplessness after disaster and in grief

The record. Sleep is among the first things lost after catastrophe. A systematic review of five studies of wildfire survivors found insomnia in 63 to 72.5 per cent and nightmares in 33.3 to 46.5 per cent between one and ten months after the fire (Isaac 2021). I found no pooled estimate for earthquakes or floods. In grief, Tess de Lang and colleagues followed 220 bereaved Dutch adults and found three courses: 47 per cent resilient, 43 per cent recovering over the year and 10 per cent with chronic insomnia. Probable prolonged grief disorder at one year was present in 9, 27 and 60 per cent of these groups, and depression at the start was the best predictor of the chronic course (de Lang 2024). MI-04 adds that insomnia predicts later depression with an odds ratio of 2.60 (1.98 to 3.42) across 21 studies (THRIVING library, MI-04).

What science infers. After the Fall most people will sleep badly for weeks, and most will recover without treatment. The insomnia that persists for months is a warning sign of depression and prolonged grief, and the healer should watch for it. The behavioural treatments in section 4 were tested in chronic insomnia, usually defined as trouble on at least three nights a week for at least three months [VERIFY: the definition is from the diagnostic manuals, which I did not read]. In the first weeks the right measures are safety, routine, company, morning light and a fixed rising time (MI-01, MI-04 Protocol 4), not sleep restriction.

4. Treatment without pills: CBT for insomnia and the parts a lay person can deliver

What it is. Cognitive behavioural therapy for insomnia (CBT-I) combines sleep restriction (shortening time in bed to match actual sleep), stimulus control (the bed only for sleep), a fixed rising time, relaxation, work on worry about sleep, and hygiene advice, usually in four to eight weekly sessions.

What the record shows. James Trauer and colleagues pooled 20 trials with 1,162 participants, mean age 56. CBT-I shortened the time to fall asleep by 19.03 minutes (14.12 to 23.93), reduced waking after sleep onset by 26.00 minutes (15.48 to 36.52) and raised sleep efficiency by 9.91 percentage points (8.09 to 11.73). Total sleep time rose by only 7.61 minutes (−0.51 to 15.74, not significant). Gains held at later follow-up and no trial reported harm (Trauer 2015). Annemieke van Straten, Charles Morin, Jaap Lancee and colleagues pooled 87 trials with 3,724 patients and found large effects on insomnia severity (g = 0.98) and smaller ones on efficiency (0.71), waking after onset (0.63), sleep latency (0.57) and total sleep (0.16). Face-to-face treatment of four or more sessions did better than self-help (van Straten 2018).

The comparison with pills matters most. Morin and colleagues randomised 78 older adults to CBT, temazepam, both or placebo. Waking after sleep onset fell by 55 per cent with CBT, 46.5 per cent with temazepam, 63.5 per cent with both and 16.9 per cent with placebo. Only the CBT gains lasted after treatment stopped (Morin 1999).

The guideline. The American Academy of Sleep Medicine makes a strong recommendation for multicomponent CBT-I, conditional recommendations for brief behavioural therapy, sleep restriction alone, stimulus control alone and relaxation, and a conditional recommendation against sleep hygiene alone. It rates the evidence for single components as low quality (Edinger 2021). The pamphlet hygiene lists have never been shown to work by themselves.

Sleep restriction, the strongest single part. Arthur Spielman's method uses a sleep diary to find sleep efficiency (sleep divided by time in bed). Below 85 per cent (80 in the elderly), time in bed is cut to the average sleep, never under 5 hours, the rising time is fixed, and the window is widened or narrowed by 15 to 30 minutes each week by efficiency (Spielman 2011, arithmetic in Protocol 3). Leonie Maurer and colleagues pooled 8 trials of sleep restriction alone and found effects on insomnia severity of g = −0.93, efficiency 0.91, latency −0.62 and waking after onset −0.83, with no change in total sleep, though most trials carried a high risk of bias (Maurer 2021). It also lifts depressive symptoms (g = −0.45 in 7 trials, 1,102 people) (Tse 2024).

Can a lay person deliver it? Yes, on the best evidence available. Daniel Buysse's brief behavioural treatment (BBTI) was given by a nurse in one 45 to 60 minute session, a 30-minute follow-up at two weeks and two 20-minute telephone calls. It had four rules: reduce time in bed, get up at the same time every day, do not go to bed unless sleepy, and do not stay in bed unless asleep. The window was average sleep plus 30 minutes, never under 6 hours. In 79 older adults (mean age 71.7) it produced a response in 67 per cent against 25 per cent with an information leaflet, and 55 per cent against 13 per cent were free of insomnia, a number needed to treat of 2.4, with gains held at six months (Buysse 2011). In the HABIT trial in 35 English general practices, briefly trained practice nurses gave four sessions of sleep restriction to 642 adults. At six months the insomnia severity score was 10.9 against 13.9 with a hygiene booklet alone (difference −3.05, −3.83 to −2.28, effect size −0.74), at £2,076 per quality-adjusted life year, with eight serious adverse events in each arm and none related to treatment (Kyle 2023).

The cost of the first weeks. Sleep restriction works by making people sleepier first. In 16 patients studied with polysomnography, sleep fell by 91 minutes on night 1, 78 on night 8 and 69 on night 22 compared with baseline, and sleepiness and lapses of attention rose in weeks one to three, returning to baseline by three months (Kyle 2014). The guideline warns that restriction may be unsafe for drivers and machine operators, for people prone to mania or hypomania, for those with poorly controlled seizures and for those already very sleepy by day (Edinger 2021). In a village the equivalent jobs are the forge, felling, roofing, the mill, handling large animals and the night watch itself.

Beyond MI-04. MI-04 gives a fixed rising time and morning light for mood but not sleep restriction or stimulus control (THRIVING library, MI-04). Protocol 3 adds both.

5. The sleeping plants

The traditions on their own terms. In the English household books of 1650 to 1750 sleeplessness was treated mostly through the nose: pillows, nosegays and cloths soaked in rosewater, vinegar or crushed seeds laid on the temples, alongside poppy syrups (Fletcher and Handley 2026). The hop pillow belongs to the same tradition, and a European belief held that hop pickers grew drowsy at their work (EMA HMPC 2014b). In Chinese medicine the seed of the sour jujube, suanzaoren (*Ziziphus jujuba* var. *spinosa*), is the classic herb to "nourish the heart and calm the spirit" when sleeplessness comes with palpitations and worry [VERIFY: I did not read a classical text].

What the record shows overall. Michael Leach and Amy Page pooled 14 randomised trials with 1,602 participants of valerian, chamomile, kava and the Chinese preparation wuling. No herb differed from placebo on any of 13 sleep measures, and valerian caused more adverse events than placebo (Leach and Page 2015). A network meta-analysis of 186 mostly Chinese trials ranked suanzaoren formulas among the best, but the trials are small and poorly blinded (Li 2025).

Valerian (*Valeriana officinalis*, root and rhizome, Caprifoliaceae). Stephen Bent and colleagues pooled 16 studies with 1,093 patients. A relative risk of improved sleep of 1.8 (1.2 to 2.9) came from only 6 of those studies, and the authors found evidence of publication bias (Bent 2006). Maria Fernández-San-Martín and colleagues pooled 18 placebo-controlled trials and found a relative risk of 1.37 (1.05 to 1.78) on a yes or no question about better sleep, but no difference on a sleep quality scale (standardised difference −0.02) and a difference in time to fall asleep of 0.70 minutes (Fernández-San-Martín 2010). A trial in 184 adults of a valerian and hops tablet against diphenhydramine and placebo found modest subjective gains, few significant comparisons and no difference on polysomnography (Morin 2005).

Here I differ from PH-01. PH-01 reports Bent's pooled relative risk of 1.8 for 16 studies and 1,093 patients as though it summarised all of them. The pooled figure came from 6 of the 16 (Bent 2006). PH-01 grades valerian C for sleep, which I keep for the tradition, but the trials point to a small, subjective effect at best (THRIVING library, PH-01).

Doses from two sources. The European Medicines Agency grants the 400 to 600 mg dry extract "well-established use" for mild nervous tension and sleep disorders, and gives as traditional use 0.3 to 3 g of root as tea in 150 ml of boiling water, or 3 ml of a 1:5 tincture in 70 per cent ethanol, half an hour to an hour before bed with an earlier evening dose if needed, up to 4 doses a day, for 2 to 4 weeks before any effect is expected. Not under 12, not in pregnancy or breastfeeding, not for acute use (EMA HMPC 2016). Health Canada allows 0.3 to 12 g of dried root a day for adults over 18, never more than 3.6 g in a single dose, 30 to 60 minutes before bed (Health Canada 2024). The sources differ on the single maximum (3 g against 3.6 g), on age (12 against 18), and most importantly on alcohol. EMA reports no interactions, while Health Canada says to avoid alcohol and other products that cause drowsiness. I follow Health Canada. The EMA records an overdose of about 20 g that caused fatigue, cramps, chest tightness, tremor and dilated pupils, resolving within 24 hours. A case report described heart complications and delirium after stopping high-dose valerian abruptly (Garges 1998), known to me only by its title.

Lookalikes. Valerian grows in damp places with tall divided leaves and flat heads of pale pink flowers, and its dried root smells of sweaty feet. In the same wet places grow hemlock water dropwort (*Oenanthe crocata*), whose root tubers are among the deadliest plant poisons of Europe, and hemlock (*Conium maculatum*) [VERIFY: pairing is my inference from habitat and leaf form]. Dig valerian only from a planted bed, and never use a root without the smell.

Hops (*Humulus lupulus*, female strobiles, Cannabaceae). The EMA allows only traditional use: 500 to 1,000 mg as tea in 150 to 200 ml, 30 to 60 minutes before bed. Not under 12, not in pregnancy or breastfeeding, review after two weeks (EMA HMPC 2014a). ESCOP gives 0.5 g as infusion two to four times daily or 1 to 2 ml of a 1:5 tincture (ESCOP 2003, read through EMA HMPC 2014b). The two agree. I found no trial of hops alone for sleep, only the valerian and hops tablet (Morin 2005) and an uncontrolled study in 17 nurses, in whom non-alcoholic beer with supper for 14 days shortened time to fall asleep from 20.5 to 12.0 minutes (Franco 2012). The EMA assessment report holds two curiosities. The volatile sedative 2-methyl-3-buten-2-ol is present only in traces in fresh hops and rises to about 0.15 per cent of dry weight after two years of storage, so the old pillow of stored strobiles may have had a chemical basis. And hops contain 8-prenylnaringenin, a potent plant oestrogen, which fits the folklore of menstrual changes among women hop pickers (EMA HMPC 2014b). Lookalike: white bryony (*Bryonia dioica*), a poisonous hedgerow climber, twines in the same hedges but has no cones [VERIFY].

Chamomile (*Matricaria chamomilla*, flower heads, Asteraceae). PH-01 gives 1.5 to 4 g in 150 ml three to four times a day and warns of Asteraceae allergy (THRIVING library, PH-01). For sleep the trial evidence is thin. A pilot trial in 34 adults of a standardised extract at 270 mg twice daily for 28 days found no significant benefit (Zick 2011). Lookalikes: scentless mayweed (*Tripleurospermum inodorum*) and stinking chamomile (*Anthemis cotula*) are harmless but useless, and true chamomile has a hollow cone-shaped receptacle and a sweet apple smell [VERIFY].

Passionflower (*Passiflora incarnata*, aerial parts, Passifloraceae). The EMA gives 1 to 2 g as tea in 150 ml one to four times daily, not under 12 and not in pregnancy (EMA HMPC 2014c). Andrew Ngan and Russell Conduit gave 41 young adults one cup of passionflower or placebo tea nightly for a week and found improvement in only one of six

diary measures, subjective sleep quality (Ngan and Conduit 2011). MI-04 cites a Cochrane review that could draw no conclusion for anxiety (THRIVING library, MI-04). Lookalikes: the blue passionflower (*Passiflora caerulea*) grown in gardens contains cyanogenic compounds and is not a substitute [VERIFY].

Lemon balm (*Melissa officinalis*, leaf, Lamiaceae). The EMA gives 1.5 to 4.5 g as tea in 150 ml one to three times daily, over 12 only (EMA HMPC 2013), which PH-01 repeats. I found no second independent dose source [VERIFY]. MI-04 reports a meta-analysis showing effects on anxiety and depression and grades it B (THRIVING library, MI-04). I found no good trial of lemon balm alone for sleep. Lookalikes are other mints, none dangerous, and the lemon smell identifies it.

Lavender (*Lavandula angustifolia*, flowers and oil). The oral oil extract Silexan at 80 mg a day is supported for anxiety (THRIVING library, MI-04). For sleep, two meta-analyses of inhaled aromatherapy found effects of 0.65 across 34 studies (Cheong 2021) and −1.02 in older adults, with lavender alone at −1.39 (Xu 2024), but the trials are unblinded and poor, and smell cannot be hidden from a patient. Lavender has no dangerous lookalike that I found [VERIFY]. A sachet under the pillow is cheap and harmless and fits the old English tradition of sleep by smell. Undiluted oil should never be drunk, and repeated topical use has been linked with breast growth in prepubertal children (THRIVING library, MI-04).

What science infers. None of these plants acts like a pill. Valerian may help a little after weeks of nightly use, and the others have tradition and little else. Their value is that they are safe, cheap, an evening ritual and free of dependence. Never with alcohol, and none under 12 or in pregnancy except chamomile in kitchen amounts [VERIFY: my rule].

6. The trap: alcohol, opium and salvaged pills as the sleeping draught

Alcohol. At every dose alcohol hastens sleep and deepens the first half of the night, then fragments the second half and suppresses dreaming sleep (Ebrahim 2013). The drinker sleeps fast, wakes at three, and needs more each week. In a person who snores it deepens airway collapse (section 9) [VERIFY: well established clinically, not read here].

Opium and laudanum. ME-05 owns these. It reports the signs of poisoning as drowsiness, snoring breathing and pinpoint pupils, and the rule never to give opium to infants, to the drowsy or to the drunk. The nineteenth-century soothing syrups such as Godfrey's Cordial killed infants, and Thomas Bull reported in 1854 that three in four opium deaths were in children under five (THRIVING library, ME-05, FO-05). Respiratory depression is worse when alcohol is added. An opium draught can kill an old person with a chest infection.

Salvaged hypnotics. MI-06 and ME-09 own these. MI-06 gives Heather Ashton's equivalents to diazepam 10 mg (for example zopiclone 15 mg and zolpidem 20 mg) and the taper by about a tenth of the dose per step, and ME-09 stocks diazepam and phenobarbital for withdrawal and seizures, not for sleep (THRIVING library, MI-06, ME-09). Morin's trial shows why not to spend the stock on insomnia: the gain vanished when the drug stopped (Morin 1999). Over-the-counter sedating antihistamines such as diphenhydramine are no better than placebo on polysomnography in the trial above (Morin 2005), and in the old they cause confusion and urinary retention [VERIFY].

The village rule. [OWNER] No household should keep alcohol, opium or salvaged pills as a sleeping draught. Salvaged hypnotics belong to the dispensary, which uses them only for the dying, for alcohol or benzodiazepine withdrawal by MI-06's schedule, and for a few nights of acute crisis with a written stop date.

7. Nightmares after trauma

What the record shows. Imagery rehearsal therapy treats a recurrent nightmare as a learned habit. The sufferer writes down a nightmare, changes it in any way they choose, and rehearses the new version while awake each day. Barry Krakow and colleagues randomised 168 women in New Mexico who had survived sexual assault (1995 to 1999) to three group sessions or a waiting list. Among the 114 followed up, nights with nightmares fell with an effect size of 1.24, nightmares per week 0.85, sleep quality 0.67 and post-traumatic stress symptoms 1.00. Of the treated women 65

per cent improved by at least one level of severity, while 69 per cent of controls stayed the same or worsened (Krakow 2001). The American Academy of Sleep Medicine recommends imagery rehearsal for nightmare disorder, which affects about 4 per cent of adults, says prazosin "may be used", and does not recommend clonazepam or venlafaxine (Morgenthaler 2018). MI-01 covers distress after trauma but not nightmares (THRIVING library, MI-01).

Prazosin. This blood pressure drug blocks noradrenaline at alpha-1 receptors. Early small trials were positive. The largest trial, of 304 American veterans given prazosin up to 20 mg (men) or 12 mg (women), found no benefit on nightmares (difference 0.2 on the nightmare item, −0.3 to 0.8) or sleep quality (0.1), and systolic blood pressure fell by 6.7 mmHg. Suicidal ideation was reported by 8 per cent on prazosin and 15 per cent on placebo (Raskind 2018). A meta-analysis of 6 trials with 429 patients still found an effect on nightmares (standardised difference −0.75, −1.24 to −0.27) and sleep quality (−0.57), weighted by the smaller positive trials (Reist 2021). NHS Highland's guideline (2024) starts at 1 mg at night, rises to 2 mg after two to three days and then by 1 mg every two to seven days, usually to between 1 and 16 mg, with dizziness in about 10 per cent and fainting after the first dose in about 1 per cent at 2 mg or more. Fainting comes 30 to 90 minutes after a first dose and recurs if the drug is stopped and restarted at the old dose [VERIFY: from a search summary of the prescribing information].

What science infers. Imagery rehearsal costs nothing, needs paper and a patient listener, and has the stronger evidence. Prazosin is a salvage drug with mixed trials. [OWNER] whether the district holds prazosin, and who may start it.

8. The rest tradition

What the tradition says. In 1877 the Philadelphia neurologist Silas Weir Mitchell published *Fat and Blood*, a treatment for nervous exhaustion, mostly in women, built from "seclusion, certain forms of diet, rest in bed, massage" and electricity. Patients were kept in bed for six to eight weeks, cut off from family, forbidden to read or write at first, and fed milk every two hours from 3 to 4 ounces up to two quarts a day before solid meals were added (Mitchell 1877). The cure spread across Europe and America.

What the record shows. The best known patient left the best known account. Charlotte Perkins Gilman underwent the cure in 1887 and was sent home to "live as domestic a life as possible" and "never touch pen, brush or pencil" again. She obeyed for about three months, came close to mental collapse, then returned to work and recovered, and she wrote *The Yellow Wallpaper* to show the danger (Gilman 1913, read through reprints). The general case against bed rest is in the library. Chris Allen, Paul Glasziou and Chris Del Mar reviewed 39 trials of bed rest for 15 conditions with 5,777 patients and found that it helped in none and harmed in several (Allen 1999, as reported in THRIVING library, NU-01 and NU-04). NU-01 adds that ten days in bed cost an older adult about a kilogram of leg muscle and 13 per cent of knee strength, and NU-04's rule is to "protect the injured part, move everything else" (THRIVING library, NU-01, NU-04).

The polyvagal claims. The polyvagal theory of Stephen Porges holds that the vagus nerve has a newer branch for social engagement and an older one for shutdown, and many wellness texts build breathing and safety practices on it. Paul Grossman argues that all five of its basic premises are untenable or implausible, including the assumption that respiratory sinus arrhythmia measures "vagal tone" (Grossman 2023). Slow breathing and feeling safe may well help a person fall asleep. The theory adds no evidence that they do.

What science infers. Two things are called rest. Sleep at night is protective. Lying in bed by day usually harms, except in cases such as a fresh fracture or the last days of life. The convalescent should sleep at night, get up by day and do a little more each day.

9. Snoring that is not ordinary tiredness

Obstructive sleep apnoea is the repeated collapse of the throat in sleep, with snoring, pauses in breathing, gasping and daytime sleepiness. A modelling study funded by a device maker estimated that 936 million adults aged 30 to

69 have it, 425 million moderately or severely (Benjafield 2019). The STOP-Bang questionnaire scores eight items: loud Snoring, Tiredness by day, Observed stopping of breathing, high blood Pressure, BMI over 35, Age over 50, Neck over 40 cm, and male Gender. A score of 0 to 2 is low risk, 3 to 4 intermediate and 5 to 8 high, and a score of 3 or more detected 93 per cent of moderate and 100 per cent of severe apnoea in surgical patients, at the cost of many false alarms (Chung 2016). After the Fall there will be no breathing machines. What remains is recognition, sleeping on the side, weight loss, no alcohol or sedatives at night, and keeping the very sleepy away from dangerous work. Its importance here is that it makes every sleeping draught more dangerous and that it mimics insomnia and depression, and that sleep restriction makes it worse [VERIFY: last point is the guideline's caution about daytime sleepiness, applied by me].

Evidence grades

Practice	Grade	Basis
Two sleeps as the universal pre-industrial pattern	D	Ekirch's texts, contradicted by Yetish, Verhoeven
Two sleeps under long dark nights	B	Wehr 1992, Samson 2017
Short sleep raises infection risk	B	Cohen 2009, Prather 2015, Spiegel 2023
Sleep loss slows wound repair	B	Smith 2018, 2022, Das 2025
Multicomponent CBT-I	A	Trauer 2015, van Straten 2018, Edinger 2021
Sleep restriction or BBTI, lay or nurse delivered	A	Buysse 2011, Kyle 2023, Maurer 2021
Stimulus control, fixed rising time	B	Guideline, low-quality single-component trials
Sleep hygiene alone	X	Edinger 2021 recommends against
Valerian root	C	Tradition, small subjective effect, Leach null
Hops, passionflower, chamomile for sleep	D	No convincing single-herb trial
Lemon balm for sleep	D	Anxiety evidence only (MI-04 B)
Lavender inhalation	C	Poor unblinded trials, cross-cultural use
Alcohol or opium as sleeping draught	X	Ebrahim 2013, ME-05
Hypnotics for chronic insomnia	X	Gains not sustained (Morin 1999), MI-06
Imagery rehearsal for nightmares	A	Krakow 2001, Morgenthaler 2018
Prazosin for nightmares	C	Positive small trials, null large trial
Bed rest for convalescence	X	Allen 1999
Weir Mitchell rest cure	X	No trials, Gilman's case
Polyvagal-based practices	D	Theory, disputed
STOP-Bang screening	A	Chung 2016 (as a screen only)

Means ledger

Practice	Hands and knowledge	Hearth	Garden and still	Village dispensary	District infirmary	Hospital before the Fall
Understanding normal sleep	Teach that the winter waking is normal	Fixed rising, firelight only	Same	Talks, written rules	Same	Same, plus sleep clinics
Sleep restriction, stimulus control	Full treatment needs only a rule and a timekeeper	Sand-glass or candle marks for the window	Same	Lay sleep-keeper, diaries	Nurse sessions, follow-up	CBT-I therapists, apps
Sedative plants	None	Teas from bought or gathered herb	Planted beds, tinctures, a scale	Graded stock, records	Same	Standardised extracts
Hypnotics	None	None (do not hold)	None	Salvaged stock, locked	Tapering, supervision	Prescribed, short courses
Nightmares	Imagery rehearsal	Paper and pencil	Same	Group sessions	Prazosin if salvaged, blood pressure cuff	Therapists, prazosin
Apnoea	Listening at the bedside	Side sleeping	Same	STOP-Bang, tape measure	Same, weight programme	Sleep study, CPAP, surgery
Rest after illness	Get up by day	Same	Same	Graded activity	Physiotherapy	Same

The rungs change little, because the effective treatments are behavioural and free. The garden adds plants of small effect, the dispensary a trained person, records and a locked cupboard, the district the nurse-led course and the blood pressure cuff prazosin needs. The hospital's one large advantage is the breathing machine for apnoea.

Harm test

Sleep restriction. It harms by sleepiness. Expect an hour less sleep in the first week and more lapses of attention for three weeks (Kyle 2014). Never use it with mania or bipolar disorder (sleep loss can trigger mania), poorly controlled epilepsy, severe daytime sleepiness, suspected apnoea, pregnancy [VERIFY: my extension], or in people who cannot be kept off dangerous work for three weeks. Signs it is going wrong: falling asleep while sitting by day, near accidents, rising energy with little need for sleep, racing speech. Then lengthen the window by an hour and stop if mania is suspected.

Plants. Allergy to chamomile in those allergic to ragweed, daisies or marigolds. Not under 12 or in pregnancy (EMA monographs). Valerian may impair driving and work, and the 20 g overdose caused tremor and chest tightness. Abrupt stopping of high doses may cause withdrawal (Garges 1998). Hops carry a plant oestrogen. Lavender oil must not be swallowed and may cause breast growth in children with repeated skin use. The great danger is misidentification: water dropwort or hemlock dug as valerian kills. Do not combine with alcohol or salvaged hypnotics.

Alcohol and opium. Dependence, rebound waking, worse apnoea, falls in the old, and death from stopped breathing, especially in infants, the old, the drunk and those with chest infections (ME-05). Signs: cannot be woken, slow

or snoring breathing, pinpoint pupils with opium. Then lay the person on their side, keep the airway open, keep them warm, do not leave them alone (ME-05).

Salvaged hypnotics. Falls, confusion, dependence within weeks and withdrawal fits on sudden stopping (MI-06 cites Hollister's 1961 chlordiazepoxide fits). Never stop abruptly after more than a few weeks. Taper by MI-06's schedule (THRIVING library, MI-06).

Prazosin. Fainting after the first dose or a fast increase, falls in the old at night, low blood pressure in the dehydrated. Never start it in someone with diarrhoea, fever or bleeding, and start at 1 mg at bedtime with the patient in bed.

Bed rest and the rest cure. Muscle loss, clots, pressure sores, pneumonia, constipation, low mood and dependence (NU-01, NU-04). Gilman's near collapse is the historical case.

The sickroom at night. Hot-water bottles burn the sleeping and the numb, and an unflued fire in a sleeping room can kill by carbon monoxide (THRIVING library, NU-03).

Red flags

- **Days without sleep and no wish for it**, with fast speech, grand plans or spending: mania. Do not restrict sleep. Seek the district and keep the person safe (MI-04).
- **New confusion at night in an old or sick person**: delirium, often from infection, dehydration, retention of urine or a drug. Look for the cause (NU-01).
- **Unrousable sleep, slow or snoring breathing**, after alcohol, opium or pills: poisoning. Side position, airway, warmth, watch all night (ME-05).
- **Breathlessness on lying flat**, needing several pillows or sitting up to sleep: heart failure or lung disease [VERIFY: clinical knowledge not read here].
- **Drenching night sweats with weight loss and cough**: tuberculosis or cancer [VERIFY].
- **Witnessed pauses in breathing with sleepiness at work**: apnoea. Keep from the forge, the roof and the cart.
- **Insomnia with hopelessness, talk of death or giving away possessions**: follow MI-08, which owns suicide risk.
- **Nightmares with daytime flashbacks, avoidance and startle beyond a month**: post-traumatic stress, for MI-01's care.

Honest comfort: where the cause cannot be treated, sleep can still be protected with position, warmth, company and quiet, and the dispensary's reserved drugs exist for the dying (ME-05, MI-06).

The case against

Against the romance of the old. Natalie Boyce and Gerrit Verhoeven argue that Ekirch's two sleeps are largely an artefact of reading and that most early modern sleep was single (Boyce 2023, Verhoeven 2021). Yetish and colleagues show that people without electricity sleep no more than we do (Yetish 2015). Michael Leach and Amy Page found no herb better than placebo (Leach and Page 2015), and valerian's benefit vanishes on every measure but a yes or no question (Fernández-San-Martín 2010). Paul Grossman argues that the polyvagal theory fails at every premise (Grossman 2023). Charlotte Perkins Gilman is the founding critic of the rest cure (Gilman 1913).

Against the romance of the hospital. The hypnotic's benefit stops with the pill (Morin 1999). The largest prazosin trial was null (Raskind 2018). Most of what clinics offer for insomnia is the behavioural course that a lay person can learn.

Against CBT-I itself. Simon Kyle, one of its advocates, showed that sleep restriction makes people sleepier and less alert for weeks (Kyle 2014). Total sleep barely changes (Trauer 2015, Maurer 2021), so CBT-I changes how long

people lie awake more than how long they sleep. Most trials enrolled older Western patients, not people in famine or grief.

Against sleep as medicine. The infection studies are small and their confidence intervals wide (Prather 2015). The wound effect is under a day after extreme restriction (Smith 2018). A book that recommends sleep everywhere should not promise that sleep heals anything by itself.

10-line summary

1. Two sleeps appear under long dark nights, not as a universal pre-industrial norm.
2. Foragers without electricity sleep 5.7 to 7.1 hours in one block and rarely report insomnia.
3. Under 6 hours of sleep about quadruples the odds of catching a cold in challenge studies.
4. Severe sleep loss delays a small wound by under a day, and protein offsets part of it.
5. Most people recover from disaster and grief insomnia, and about 1 in 10 bereaved stay sleepless.
6. CBT-I shortens waking by about 20 to 25 minutes a night and its gains last.
7. Sleep restriction with a fixed rising time can be taught by a nurse or lay person in four sessions.
8. Sleep hygiene alone does not work.
9. Valerian and the other sleep herbs are safe but weak, and never to be mixed with alcohol.
10. Alcohol and opium as sleeping draughts kill, and bed rest harms.

Open questions

- Will a post-collapse village with 14-hour winter nights sleep in two bouts, and will that be harmless?
- Is sleep restriction safe for hungry, overworked people whose work is physically dangerous?
- Does valerian have any effect beyond placebo when grown and brewed at home rather than extracted?
- Do the Chinese suanzaoren trials hold up when blinded and replicated outside China?
- Is hop storage for two years really what makes the pillow sedative?
- How can a sleep diary be kept without clocks, and how accurate is it?
- Does grief insomnia respond to the same treatment as ordinary chronic insomnia?
- Is prazosin worth stockpiling after the null veteran trial?

Sources to read in full

1. Yetish and others 2015, *Current Biology*, for the field data on sleep without electricity.
2. Ekirch 2024 and Boyce 2023, *Medical History*, for the debate in both voices.
3. Edinger and others 2021, the AASM guideline, for the rules and their cautions.
4. Spielman, Yang and Glovinsky 2011, the sleep restriction chapter, for the arithmetic.
5. Buysse and others 2011, for the brief treatment a nurse can deliver.
6. Kyle and others 2023, the HABIT trial, for delivery by practice nurses.
7. EMA HMPC 2016 valerian monograph, for doses and cautions.
8. Krakow and others 2001, for imagery rehearsal.
9. Allen, Glasziou and Del Mar 1999, for bed rest.

At the bedside after the Fall

The household. The minimum is four habits: rise at the same time every day, go outside in the first hour of daylight, go to bed only when sleepy and get up when sleep will not come, and keep alcohol and opium out of the evening. In long winter nights, expect the midnight waking and treat it as normal. Add a cup of lemon balm or chamomile tea as a ritual if wanted. In the sickroom, follow NU-03's night watch. To start it needs these rules, a shaded lamp and some way of telling the hour. The first failure to expect is the bottle: a sleepless adult in grief starting a nightly drink.

The village of 300. The minimum is one trained person, a sleep-keeper, who can run the four-session sleep window course, teach imagery rehearsal and screen snorers. It needs diaries on paper, a garden bed of valerian, lemon balm and chamomile, hop vines on a fence, and a locked dispensary that holds any salvaged hypnotics and records each dose. [OWNER] whether the village keeps quiet hours, for example no hammering or loud work between the evening bell and dawn, and whether a bell marks a fixed rising time. Expect between about 5 and 20 adults with chronic insomnia at any time, depending on whether the forager rate of 2 to 3 per cent or the industrial rate of 10 per cent applies [VERIFY: my estimate]. The first failure to expect is a person on a tight sleep window falling asleep at dangerous work, or a sleeping draught given to an old man who snores.

The district of 3,000. The minimum adds a nurse who teaches the sleep-keepers, holds the follow-up sessions, sees the red flags, holds prazosin if salvaged and has a blood pressure cuff, and runs benzodiazepine tapers by MI-06. It needs a scale, a tape measure, a register of patients on hypnotics and a stock plan. The first failure to expect is the end of the salvaged hypnotic stock, with withdrawal fits in people stopped abruptly.

Protocols

Protocol 1. The sickroom night watch (extends NU-03 Protocol 6)

1. Follow NU-03 Protocol 6 in full: plan before dark, bundle tasks, two visits a night on a good surface and three on a hard one, never wake from first sleep for what can wait an hour, speak plainly, the carer sleeps outside, wake the relief (THRIVING library, NU-03).
2. Set the rota before dark. No watcher keeps more than two nights in a row, and each gets an unbroken 6 hours the next day [VERIFY: my rule]. [OWNER] the rota rule.
3. One lamp, shaded, at floor level, away from the patient's eyes. Never an unflued brazier in the room.
4. Check without waking: from the doorway, watch the chest for 30 seconds and count breaths. Note the count and the hour.
5. Wake the patient only for breathing under 8 or over 30 a minute, noisy or irregular breathing, new confusion or fever, a medicine that cannot wait, a soaked bed or a due turn [VERIFY: thresholds from general practice].
6. No sleeping draught of alcohol, opium or salvaged pills without the dispensary's written order.
7. At dawn, open the shutters, sit the patient up and give a drink. Daylight and a fixed waking time protect the next night.
8. For new confusion at night, keep the lamp low, say the patient's name, where they are and who you are, and report at dawn so the cause is sought (NU-01).

Protocol 2. The sleep rules for the sleepless after the Fall (first weeks)

For anyone sleeping badly in the first three months after a disaster or loss.

1. Rise at the same time every day, whatever the night was like. Tolerance: 30 minutes.
2. Go outdoors for 30 to 60 minutes in the first hours of daylight (THRIVING library, MI-04 Protocol 4). Work by day.
3. Nap only if needed, no more than 30 minutes, not after mid-afternoon [VERIFY: inference from Yetish 2015].
4. No alcohol in the evening, no opium, no pills unless the dispensary orders them.
5. Go to bed only when sleepy, not just when it is dark. In winter that may be two or three hours after dark.
6. If awake and fretting for what feels like a quarter of an hour, get up, sit in dim cool light doing something dull, and return when sleepy. Repeat as needed.
7. A midnight waking in a long winter night that ends in sleep again is normal, not failure.
8. Write worries on paper in the early evening and put the paper away.
9. A cup of lemon balm or chamomile tea an hour before bed is allowed as a ritual.
10. Bring the person to the sleep-keeper if sleeplessness lasts beyond a month, comes with hopelessness, or shows any red flag.

Protocol 3. The sleep window (for insomnia lasting three months or more)

Exclude first: mania or bipolar disorder, poorly controlled fits, apnoea (STOP-Bang 3 or more with witnessed pauses), pregnancy, falling asleep by day, and work at the forge, mill, roof, felling or the night watch that cannot be paused for three weeks.

1. Diary for 1 to 2 weeks: each morning note time to bed, rough time to sleep, wakings, time up, and how the day went. Without a clock, use a candle marked in hours, a sand-glass or the village bell [OWNER].
2. Average the hours slept and the hours in bed. Sleep efficiency = sleep ÷ bed × 100.
3. If efficiency is under 85 per cent, set the window: average sleep plus 30 minutes, never under 6 hours (Buysse 2011). [OWNER] whether to allow Spielman's floor of 5 hours for the young and healthy.
4. Fix the rising time first, seven days a week. Count back to set the earliest bedtime.
5. Rules inside the window: bed only when sleepy, out of bed when awake and fretting, bed for sleep and sex only, no naps for the young (older people may take 30 minutes).
6. Expect to sleep about an hour less in week one and to feel worse for up to three weeks (Kyle 2014). Keep off dangerous work and do not walk alone at night.
7. Weekly review: efficiency 90 per cent or more (85 per cent over 65), widen by 15 to 30 minutes. 85 to 90 per cent, keep. Under 85 per cent, narrow by 15 to 30 minutes, never below the floor (Spielman 2011).
8. Four sessions over 6 to 8 weeks: a first session of 45 to 60 minutes, then three of 20 to 30 minutes (Buysse 2011, Kyle 2023).
9. Stop and refer if mania signs appear, if the person falls asleep at work, or if no gain by 8 weeks.

Protocol 4. Sleep teas

Plant, part	Dose per cup (150 ml boiling water)	Timing	Duration and limits
Valerian root	2 to 3 g dried root, steep covered 10 to 15 min	30 to 60 min before bed	Up to 4 cups a day, single dose no more than 3.6 g (Health Canada 2024). 2 to 4 weeks before judging. Over 12 (EMA) or 18 (Health Canada)
Hops strobile	0.5 to 1 g (150 to 200 ml)	30 to 60 min before bed	Over 12. Review after 2 weeks
Passionflower herb	1 to 2 g	Evening, up to 4 a day	Over 12. Review after 2 weeks
Lemon balm leaf	1.5 to 4.5 g	Evening, up to 3 a day	Over 12
Chamomile flower	1.5 to 4 g	Evening	Not with daisy-family allergy

1. Weigh on the dispensary scale until a household measure (a level spoon) has been checked against it [VERIFY: spoon weights vary by herb].
2. Cover the cup while steeping to keep volatile oils (THRIVING library, ME-01).
3. Never with alcohol, salvaged sleeping pills or opium.
4. Not in pregnancy or breastfeeding, except chamomile in kitchen amounts [OWNER].
5. Stop if rash, stomach upset, palpitations or morning grogginess appear. Stop valerian gradually after long high doses.
6. Hop pillow: a cloth bag of 200 to 500 g of dried strobiles stored for at least a year (EMA HMPC 2014b). Lavender sachet as wanted.

Protocol 5. Nightmare rescripting (imagery rehearsal) and prazosin

1. Begin when the person sleeps in safety and has some daytime calm, usually weeks after the event (MI-01).
2. Choose a recurring nightmare, not the worst one, to start.
3. Write it down briefly. Then change it in any way the person chooses. Write the new version.
4. Rehearse the new version in imagination for 10 to 20 minutes each day [VERIFY: duration from secondary accounts of Krakow's protocol].
5. After a week, add another nightmare if needed. Three sessions of teaching are enough for most (Krakow 2001).
6. Prazosin (district only, if salvaged and [OWNER] approves): 1 mg at bedtime, in bed, for 2 to 3 nights, then 2 mg, then up by 1 mg every 2 to 7 days if needed, usually to 6 to 10 mg. Check blood pressure lying and standing before each rise. Not for the dehydrated, those with low blood pressure, or with other blood pressure drugs. If a dose is missed for more than two days, restart at 1 mg (NHS Highland 2024).

Protocol 6. The snoring screen

1. Ask the bed partner about loud snoring, pauses in breathing and gasping.
2. Score STOP-Bang, one point each: loud snoring, tired by day, observed stopping, high blood pressure, BMI over 35 (or very heavy, if no scale), age over 50, neck over 40 cm measured with a tape at the Adam's apple, male.
3. 0 to 2: low risk. 3 to 4: intermediate. 5 to 8: high (Chung 2016).
4. For 3 or more: sleep on the side (a ball sewn into the back of the nightshirt is a common device [VERIFY]), no alcohol or sedatives at night, weight loss if heavy, no sleep restriction, and no dangerous work alone if sleepy by day.

Numbers to carry

1. Adults need 7 to 9 hours, over 65s 7 to 8 (Hirshkowitz 2015). Foragers sleep 5.7 to 7.1 (Yetish 2015).
2. Under 6 hours of sleep: about 4 times the odds of a cold (Prather 2015).
3. Sleep efficiency under 85 per cent means time in bed is too long.
4. Sleep window: average sleep plus 30 minutes, never under 6 hours. Adjust by 15 to 30 minutes a week.
5. Brief behavioural treatment: 1 in 2.4 treated recovers who otherwise would not (Buysse 2011).
6. Valerian: 2 to 3 g root a cup, 30 to 60 minutes before bed, 2 to 4 weeks to judge, never with alcohol.
7. About 1 in 10 bereaved stay sleepless after a year (de Lang 2024).
8. STOP-Bang 3 or more: suspect apnoea.
9. Bed rest: 39 trials, none showed benefit (Allen 1999).
10. Prazosin starts at 1 mg at bedtime, in bed.

References

1. Allen C, Glasziou P, Del Mar C (1999). Bed rest: a potentially harmful treatment needing more careful evaluation. Lancet 1999, 354:1229-1233. Not read by me. Figures as reported in THRIVING library NU-01 and NU-04, which read the abstract. https://pubmed.ncbi.nlm.nih.gov/10520630/
2. Benjafield AV, Ayas NT, Eastwood PR, Heinzer R, and others (2019). Estimation of the global prevalence and burden of obstructive sleep apnoea: a literature-based analysis. Lancet Respiratory Medicine 2019, 7(8):687-698. Abstract read. https://pubmed.ncbi.nlm.nih.gov/31300334/
3. Bent S, Padula A, Moore D, Patterson M, Mehling W (2006). Valerian for sleep: a systematic review and meta-analysis. American Journal of Medicine 2006, 119(12):1005-1012. Abstract read. https://pubmed.ncbi.nlm.nih.gov/17145239/
4. Boyce N (2023). Have we lost sleep? A reconsideration of segmented sleep in early modern England. Medical History 2023, 67(2):91-108. Not read. Known only through Ekirch 2024.

https://doi.org/10.1017/mdh.2023.13 [VERIFY DOI]
5. Buysse DJ, Germain A, Moul DE, and others (2011). Efficacy of brief behavioral treatment for chronic insomnia in older adults. Archives of Internal Medicine 2011, 171(10):887-895. Full text read. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3101289/
6. Cheong MJ, Kim S, Kim JS, Lee H, and others (2021). A systematic literature review and meta-analysis of the clinical effects of aroma inhalation therapy on sleep problems. Medicine (Baltimore) 2021, 100(9):e24652. Abstract read. https://pubmed.ncbi.nlm.nih.gov/33655928/
7. Chung F, Abdullah HR, Liao P (2016). STOP-Bang questionnaire: a practical approach to screen for obstructive sleep apnea. Chest 2016, 149(3):631-638. Full text read. https://pubmed.ncbi.nlm.nih.gov/26378880/
8. Cohen S, Doyle WJ, Alper CM, Janicki-Deverts D, Turner RB (2009). Sleep habits and susceptibility to the common cold. Archives of Internal Medicine 2009, 169(1):62-67. Abstract read. https://pubmed.ncbi.nlm.nih.gov/19139325/
9. Das A, Gupta R, Huda F, Kumar N, and others (2025). Effect of sleep quality on wound healing among patients undergoing emergency laparotomy: an observational study. Journal of Clinical Sleep Medicine 2025, 21(3):503-512. Abstract read. https://pubmed.ncbi.nlm.nih.gov/39484803/
10. de Lang TA, Buyukcan-Tetik A, de Jong PJ, Lancel M, and others (2024). Trajectories of insomnia following bereavement. Sleep Medicine 2024, 114:159-166. Abstract read. https://pubmed.ncbi.nlm.nih.gov/38194898/
11. Ebrahim IO, Shapiro CM, Williams AJ, Fenwick PB (2013). Alcohol and sleep I: effects on normal sleep. Alcoholism: Clinical and Experimental Research 2013, 37(4):539-549. Abstract read. https://pubmed.ncbi.nlm.nih.gov/23347102/
12. Edinger JD, Arnedt JT, Bertisch SM, and others (2021). Behavioral and psychological treatments for chronic insomnia disorder in adults: an American Academy of Sleep Medicine clinical practice guideline. Journal of Clinical Sleep Medicine 2021, 17(2):255-262. Full text read. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7853203/
13. Ekirch AR (2005). At Day's Close: Night in Times Past. New York, W. W. Norton. Not read. Known through Ekirch 2024 and secondary summaries.
14. Ekirch AR (2024). Reflections on "Have we lost sleep?" Medical History. Full text read. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11655156/
15. ESCOP (2003). ESCOP Monographs, second edition, Lupuli flos. Exeter, European Scientific Cooperative on Phytotherapy. Not read. Dose as quoted in EMA HMPC 2014b.
16. European Medicines Agency, Committee on Herbal Medicinal Products (2013). Community herbal monograph on Melissa officinalis L., folium. EMA/HMPC/196745/2012. Full text read. https://www.ema.europa.eu/en/medicines/herbal/melissae-folium
17. European Medicines Agency, Committee on Herbal Medicinal Products (2014a). Community herbal monograph on Humulus lupulus L., flos. EMA/HMPC/682384/2013. Full text read. https://www.ema.europa.eu/en/medicines/herbal/lupuli-flos
18. European Medicines Agency, Committee on Herbal Medicinal Products (2014b). Assessment report on Humulus lupulus L., flos. EMA/HMPC/418902/2005 Rev. 1. Full text read. https://www.ema.europa.eu/en/medicines/herbal/lupuli-flos [VERIFY year]
19. European Medicines Agency, Committee on Herbal Medicinal Products (2014c). Community herbal monograph on Passiflora incarnata L., herba. EMA/HMPC/669740/2013. Full text read from a hosted copy. https://www.ema.europa.eu/en/medicines/herbal/passiflorae-herba
20. European Medicines Agency, Committee on Herbal Medicinal Products (2016). European Union herbal monograph on Valeriana officinalis L., radix. EMA/HMPC/150848/2015. Full text read. https://www.ema.europa.eu/en/medicines/herbal/valerianae-radix
21. Fernández-San-Martín MI, Masa-Font R, Palacios-Soler L, Sancho-Gómez P, and others (2010). Effectiveness of valerian on insomnia: a meta-analysis of randomized placebo-controlled trials. Sleep Medicine 2010,

11(6):505-511. Abstract read. https://pubmed.ncbi.nlm.nih.gov/20347389/
22. Fletcher H, Handley S (2026). Sleep, scent, and household medical care in early modern England. History Workshop Journal. Full text read. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC13242262/
23. Franco L, Sánchez C, Bravo R, Rodríguez AB, and others (2012). The sedative effect of non-alcoholic beer in healthy female nurses. PLoS One 2012, 7(7):e37290. Abstract read. https://pubmed.ncbi.nlm.nih.gov/22815680/
24. Garges HP, Varia I, Doraiswamy PM (1998). Cardiac complications and delirium associated with valerian root withdrawal. JAMA 1998, 280(18):1566-1567. Title only read. https://pubmed.ncbi.nlm.nih.gov/9820254/
25. Gilman CP (1913). Why I wrote The Yellow Wallpaper. The Forerunner, October 1913. Read through secondary reprints and summaries only.
26. Grossman P (2023). Fundamental challenges and likely refutations of the five basic premises of the polyvagal theory. Biological Psychology 2023, 180:108589. Abstract read. https://pubmed.ncbi.nlm.nih.gov/37230290/
27. Health Canada (2024). Valerian, Valeriana officinalis. Natural Health Products Ingredients Database monograph, 26 July 2024. Full text read. https://webprod.hc-sc.gc.ca/nhpid-bdipsn/dbImages/1162
28. Hirshkowitz M, Whiton K, Albert SM, and others (2015). National Sleep Foundation's sleep time duration recommendations: methodology and results summary. Sleep Health 2015, 1(1):40-43. Abstract read. https://doi.org/10.1016/j.sleh.2014.12.010
29. Isaac F, Toukhsati SR, Di Benedetto M, Kennedy GA (2021). A systematic review of the impact of wildfires on sleep disturbances. International Journal of Environmental Research and Public Health 2021, 18(19):10152. Abstract read. https://pubmed.ncbi.nlm.nih.gov/34639453/
30. Krakow B, Hollifield M, Johnston L, Koss M, and others (2001). Imagery rehearsal therapy for chronic nightmares in sexual assault survivors with posttraumatic stress disorder: a randomized controlled trial. JAMA 2001, 286(5):537-545. Abstract read. https://pubmed.ncbi.nlm.nih.gov/11476655/
31. Kyle SD, Miller CB, Rogers Z, Siriwardena AN, and others (2014). Sleep restriction therapy for insomnia is associated with reduced objective total sleep time, increased daytime somnolence, and objectively impaired vigilance. Sleep 2014, 37(2):229-237. Abstract read. https://pubmed.ncbi.nlm.nih.gov/24497651/
32. Kyle SD, Siriwardena AN, Espie CA, Yang Y, and others (2023). Clinical and cost-effectiveness of nurse-delivered sleep restriction therapy for insomnia in primary care (HABIT): a pragmatic, superiority, open-label, randomised controlled trial. Lancet 2023, 402(10406):975-987. Abstract read. https://pubmed.ncbi.nlm.nih.gov/37573859/
33. Leach MJ, Page AT (2015). Herbal medicine for insomnia: a systematic review and meta-analysis. Sleep Medicine Reviews 2015, 24:1-12. Abstract read. https://pubmed.ncbi.nlm.nih.gov/25644982/
34. Li W, Wang Q, Dang C, Xiong Y, and others (2025). Chinese herbal medicine for insomnia: a systematic review and network meta-analysis. Medicine (Baltimore) 2025, 104(33):e43789. Abstract read. https://pubmed.ncbi.nlm.nih.gov/40826721/
35. Maurer LF, Schneider J, Miller CB, Espie CA, and others (2021). The clinical effects of sleep restriction therapy for insomnia: a meta-analysis of randomised controlled trials. Sleep Medicine Reviews 2021, 58:101493. Abstract read. https://pubmed.ncbi.nlm.nih.gov/33984745/
36. Mitchell SW (1877). Fat and Blood: and How to Make Them. Philadelphia, Lippincott. Eighth edition (1911) read in full text at Project Gutenberg, ebook 16230. https://www.gutenberg.org/ebooks/16230
37. Morgenthaler TI, Auerbach S, Casey KR, Kristo D, and others (2018). Position paper for the treatment of nightmare disorder in adults: an American Academy of Sleep Medicine position paper. Journal of Clinical Sleep Medicine 2018, 14(6):1041-1055. Abstract read. https://pubmed.ncbi.nlm.nih.gov/29852917/
38. Morin CM, Colecchi C, Stone J, Sood R, Brink D (1999). Behavioral and pharmacological therapies for late-life insomnia: a randomized controlled trial. JAMA 1999, 281(11):991-999. Abstract read. https://pubmed.ncbi.nlm.nih.gov/10086433/
39. Morin CM, Koetter U, Bastien C, Ware JC, Wooten V (2005). Valerian-hops combination and diphenhy-

dramine for treating insomnia: a randomized placebo-controlled clinical trial. Sleep 2005, 28(11):1465-1471. Abstract read. https://pubmed.ncbi.nlm.nih.gov/16335333/

40. NHS Highland (2024). Prazosin for nightmares in post-traumatic stress disorder, guideline TAM431, reviewed 27 June 2024. Full text read. [VERIFY URL] https://www.right-decisions.scot.nhs.uk/
41. Ngan A, Conduit R (2011). A double-blind, placebo-controlled investigation of the effects of Passiflora incarnata (passionflower) herbal tea on subjective sleep quality. Phytotherapy Research 2011, 25(8):1153-1159. Abstract read. https://pubmed.ncbi.nlm.nih.gov/21294203/
42. Prather AA, Janicki-Deverts D, Hall MH, Cohen S (2015). Behaviorally assessed sleep and susceptibility to the common cold. Sleep 2015, 38(9):1353-1359. Abstract and full text read. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4531403/
43. Raskind MA, Peskind ER, Chow B, Harris C, and others (2018). Trial of prazosin for post-traumatic stress disorder in military veterans. New England Journal of Medicine 2018, 378(6):507-517. Abstract read. https://pubmed.ncbi.nlm.nih.gov/29414272/
44. Reist C, Streja E, Tang CC, Shapiro B, and others (2021). Prazosin for treatment of post-traumatic stress disorder: a systematic review and meta-analysis. CNS Spectrums 2021, 26(4):338-344. Abstract read. https://pubmed.ncbi.nlm.nih.gov/32362287/
45. Samson DR, Manus MB, Krystal AD, Fakir E, and others (2017). Segmented sleep in a nonelectric, small-scale agricultural society in Madagascar. American Journal of Human Biology 2017, 29(4):e22979. Abstract read. https://pubmed.ncbi.nlm.nih.gov/28181718/
46. Smith TJ, Wilson MA, Karl JP, Orr J, and others (2018). Impact of sleep restriction on local immune response and skin barrier restoration with and without "multinutrient" nutrition intervention. Journal of Applied Physiology 2018, 124(1):190-200. Abstract read. https://pubmed.ncbi.nlm.nih.gov/28912361/
47. Smith TJ, Wilson M, Whitney C, Fagnant H, and others (2022). Supplemental protein and a multinutrient beverage speed wound healing after acute sleep restriction in healthy adults. Journal of Nutrition 2022, 152(6):1560-1573. Abstract read. https://pubmed.ncbi.nlm.nih.gov/35285906/
48. Spiegel K, Rey AE, Cheylus A, Ayling K, and others (2023). A meta-analysis of the associations between insufficient sleep duration and antibody response to vaccination. Current Biology 2023, 33(5):998-1005. Abstract read. https://pubmed.ncbi.nlm.nih.gov/36917932/
49. Spielman AJ, Yang CM, Glovinsky PB (2011). Sleep restriction therapy. In Perlis M, Aloia M, Kuhn B (eds), Behavioral Treatments for Sleep Disorders. London, Academic Press (Elsevier), pages 9-15 [VERIFY pages]. Full chapter read. https://www.med.upenn.edu/cbti/assets/user-content/documents/BTSD%20Spielman%20Chapter%20on%20SRT.pdf
50. Trauer JM, Qian MY, Doyle JS, Rajaratnam SM, Cunnington D (2015). Cognitive behavioral therapy for chronic insomnia: a systematic review and meta-analysis. Annals of Internal Medicine 2015, 163(3):191-204. Abstract read. https://pubmed.ncbi.nlm.nih.gov/26054060/
51. Tse KYK, Maurer LF, Espie CA, Kyle SD (2024). The effect of single-component sleep restriction therapy on depressive symptoms: a systematic review and meta-analysis. Journal of Sleep Research 2024, 33(6):e14180. Abstract read. https://pubmed.ncbi.nlm.nih.gov/38419123/
52. van Straten A, van der Zweerde T, Kleiboer A, Cuijpers P, Morin CM, Lancee J (2018). Cognitive and behavioral therapies in the treatment of insomnia: a meta-analysis. Sleep Medicine Reviews 2018, 38:3-16. Abstract read. https://pubmed.ncbi.nlm.nih.gov/28392168/
53. Verhoeven G (2021). (Pre)Modern sleep. New evidence from the Antwerp criminal court (1715-1795). Journal of Sleep Research 2021, 30(1):e13099. Abstract read. https://pubmed.ncbi.nlm.nih.gov/32529713/
54. Wehr TA (1992). In short photoperiods, human sleep is biphasic. Journal of Sleep Research 1992, 1(2):103-107. Abstract read. https://pubmed.ncbi.nlm.nih.gov/10607034/
55. Xu K, Wang S, Ji Q, Ni Y (2024). Effects of aromatherapy on sleep quality in older adults: a meta-analysis. Medicine (Baltimore) 2024, 103(49):e40688. Abstract read. https://pubmed.ncbi.nlm.nih.gov/39654196/
56. Yetish G, Kaplan H, Gurven M, Wood B, and others (2015). Natural sleep and its seasonal vari-

ations in three pre-industrial societies. Current Biology 2015, 25(21):2862-2868. Full text read. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4720388/

57. Zick SM, Wright BD, Sen A, Arnedt JT (2011). Preliminary examination of the efficacy and safety of a standardized chamomile extract for chronic primary insomnia: a randomized placebo-controlled pilot study. BMC Complementary and Alternative Medicine 2011, 11:78. Abstract read. https://pubmed.ncbi.nlm.nih.gov/21939549/