PREKURE CLINIC

THE PREKURE CLINIC APPROACH · SLEEP

Sleep: lifestyle, CBT-I and sleep medicines

Hours slept is one number.

Most people who sleep poorly do not have a sleep disorder, and most can sleep better without medicines. The PREKURE Clinic works out what is getting in the way of sleep, then helps change it. For chronic insomnia we use cognitive behavioural therapy for insomnia (CBT-I), the first-line treatment in every major guideline. It is mostly practical change, done in the right order with a coach.

Professor Grant Schofield and Dr Jenni Hurling

The PREKURE Clinic · Lifestyle medicine · Metabolic medicine · Behavioural medicine · Updated November 2026

PART 1

The PREKURE Clinic approach at a glance

How sleep works. Three things control sleep. Sleep drive builds the longer you are awake; caffeine blocks it, and naps and lie-ins use it up. The body clock sets when sleep comes, and a fixed wake time, morning daylight and dim evenings keep it steady. Arousal from stress, worry or a bed linked with lying awake keeps sleep away. Quality matters as well as hours. Deep sleep, mostly early in the night, supports memory and blood glucose control, and REM sleep, mostly late, helps process emotions.

The size of the problem. About 37% of New Zealand adults sleep less than 7 hours. Short sleep is linked to diabetes, high blood pressure, weight gain, low

mood and earlier death, and insomnia more than doubles the odds of later depression.

What works. For everyday poor sleep: a regular wake time, daylight, exercise, a caffeine cut-off about 9 hours before bed, less alcohol, and a cool, dark, quiet bedroom. For chronic insomnia, CBT-I helps people fall asleep about 19 minutes faster and spend 26 minutes less awake at night, and 40 to 57 in 100 reach remission. Its key parts are sleep restriction, stimulus control and changing unhelpful thoughts about sleep.

Medicines and supplements. Sleeping pills help a little, carry risks of falls, crashes and dependence, and are meant for 2 to 4 weeks at most. Started first, CBT-I gives more long-term remission than pills: about 41 against 28 in 100. Magnesium has limited evidence of a small benefit, and most other supplements have less. Loud snoring, breathing pauses or heavy daytime sleepiness need a sleep apnoea check first.



Our stance

1. CBT-I is first-line for chronic insomnia, delivered in person, by a trained coach or digitally.
2. Lifestyle changes come first for everyone, combined rather than one tip at a time, and fitted to each person's life.
3. Benzodiazepines and Z-drugs are for short courses only, with an exit plan; we support safe tapering for long-term users.
4. We avoid off-label quetiapine, mirtazapine, amitriptyline and sedating antihistamines for sleep alone.
5. We screen for sleep apnoea, depression, pain, menopause, alcohol and medicines before treating insomnia.
6. Sleep is a foundation of metabolic and mental health. We measure and publish our results.

PART 2 · THE EVIDENCE

Poor sleep and health

Poor sleep is common and linked to mental illness, heart disease, diabetes, accidents and earlier death. Most links are observational, but treatment trials suggest poor sleep is a cause as well as a symptom.

Measure	Finding	Source
Short sleep in New Zealand	37% of adults sleep less than 7 hours, more often Māori and Pacific peoples	Lee and Sibley, Sleep Health 2019
Insomnia	Symptoms in about 1 in 3 adults; insomnia disorder in about 6 in 100	Ohayon, Sleep Med Rev 2002
Short sleep and health	Higher risk of death (12%), diabetes (37%), high blood pressure (17%), heart disease (26%) and obesity (38%)	Itani, Sleep Med 2017
Insomnia and later illness	Depression odds more than doubled (OR 2.6); heart disease 45% higher; type 2 diabetes 57 to 84% higher	Baglioni 2011; Sofi 2014; Cappuccio 2010
Road safety in New Zealand	Driver fatigue linked to nearly 1 in 10 road deaths in 2021 to 2023	AA 2025
Heart failure	Among 408,802 UK Biobank adults followed for 10 years, those with the healthiest sleep pattern (a morning type, 7 to 8 hours, and no frequent insomnia, snoring or daytime sleepiness) had 42% lower risk of heart failure	Li, Circulation 2021
Infection and vaccines	Adults sleeping under 7 hours were about 3 times as likely to develop a cold after being given a cold virus, and short sleep measured objectively went with weaker antibody responses to vaccines	Cohen, Arch Intern Med 2009; Spiegel, Curr Biol 2023
WHAT IMPROVING SLEEP CHANGES		
Mood	Improving sleep reduced depression and anxiety across 65 trials	Scott, Sleep Med Rev 2021

Measure	Finding	Source
Food intake	About 1.2 hours more sleep cut intake by 270 kcal a day in overweight adults	Tasali, JAMA Intern Med 2022
New depression	CBT-I cut new or recurrent depression in adults over 60 from 26 to 12 in 100	Irwin, JAMA Psychiatry 2022

How sleep works

Sleep drive, the body clock and arousal. Sleep drive builds while we are awake, partly through a brain chemical called adenosine, and is released by sleep. Caffeine works by blocking adenosine, and long naps, lie-ins and long hours in bed use up sleep drive, so the next night is lighter. The body clock times sleepiness across the day and is set mainly by light: a regular wake time and morning daylight anchor it, and bright evening light pushes it later. Sleep comes most easily when the two line up (Borbély, J Sleep Res 2016). Arousal can override both. Insomnia often starts with a stressful event, then persists because of the habits people adopt to cope, such as long hours in bed, napping and worrying about sleep (Spielman, Psychiatr Clin North Am 1987).

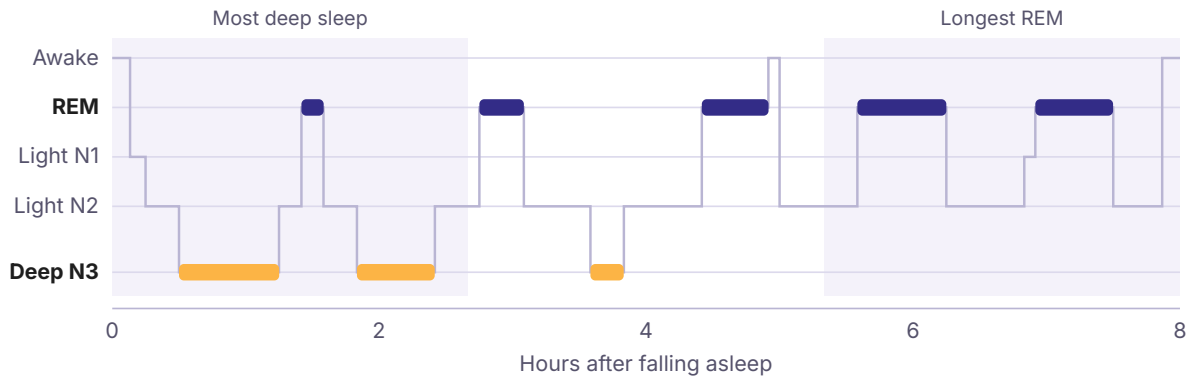
The stages of sleep. A night has four to six cycles of about 90 minutes.

Stage	Share of the night	When	What it does
Light sleep (N1, N2)	About 50 to 60%	Throughout	Links waking, deep sleep and REM
Deep sleep (N3)	About 13 to 23%, less with age	Mostly the first third	Stores new memories; supports insulin sensitivity; most growth hormone release
REM (dreaming) sleep	About 20 to 25%	Mostly the last third	Processes emotional memories; helps solve problems

Sources: IOM 2006; Rasch and Born 2013; Van Cauter and Plat 1996.

Deep sleep comes early in the night, REM sleep late

Schematic of a typical adult night, not one person's recording



Deep sleep. Suppressing deep sleep for three nights cut insulin sensitivity by about 25% in young adults, without changing total sleep (Tasali, PNAS 2008). Deep sleep falls with age, but much less in healthy adults, so some of the loss reflects poorer health and sleep apnoea (Boulos, Lancet Respir Med 2019). Sleep may also help clear waste from the brain. In mice it sped the clearance of amyloid (Xie, Science 2013), and in people one night without sleep slowed the clearance of a tracer (Eide, Brain 2021). The methods are disputed (Miao, Nat Neurosci 2024; Wrzesień, Front Neurosci 2026), so we treat this as likely but unproven.

REM sleep. REM sleep is linked to overnight easing of emotional reactions (van der Helm, Curr Biol 2011) and to better creative problem solving (Cai, PNAS 2009). Because it comes late in the night, an early alarm cuts REM first (Brunner, Sleep 1993).

What helps and what harms sleep

Each factor is modest on its own, but they add up.

What harms sleep	Effect	Source
Caffeine	About 45 minutes less sleep and less deep sleep; finish coffee about 9 hours before bed	Gardiner, Sleep Med Rev 2023
Alcohol	Faster to fall asleep, but less REM and a more broken second half of the night	Ebrahim 2013

What harms sleep	Effect	Source
Benzodiazepine and Z-drug sleeping pills	Less deep sleep; benzodiazepines also reduce REM	de Mendonça 2023; Arbon 2015
SSRI and SNRI antidepressants	Delay and suppress REM	Wichniak 2017
Other medicines	Beta blockers (less night-time melatonin, vivid dreams), steroids, donepezil and similar dementia medicines taken at night, nicotine patches worn overnight, and decongestants can all disturb sleep. A medicine review is part of our assessment	Van Gastel, Sleep Med Clin 2022
Smoking	14 minutes less sleep and less deep sleep	Zhang 2006
Screens in the evening and in bed	In children and teenagers, using a phone or tablet at bedtime roughly doubled the odds of too little sleep, and even having one in the bedroom was linked to worse sleep. A 9 pm screen curfew moved teenagers' sleep 21 minutes earlier and added 17 minutes. In adults, reading on a tablet before bed delayed melatonin and sleepiness, and each extra hour on a screen in bed was linked to 24 minutes less sleep	Carter, JAMA Pediatr 2016; Perrault, Sleep 2019; Chang 2015; Hjetland 2025
Excess weight	The main driver of sleep apnoea: a 10% weight gain raised the odds of moderate to severe apnoea about sixfold, and about 20% weight loss with tirzepatide cut breathing pauses by 27 to 30 an hour, against 5 to 6 with placebo	Peppard, JAMA 2000; Malhotra, NEJM 2024
Diet quality and evening meals	In a small controlled study, more fibre went with more deep sleep, and more saturated fat and sugar with lighter, more broken sleep. A carbohydrate meal 4 hours before bed helped people fall asleep faster, so the case against late carbohydrate is weak	St-Onge 2016; Afaghi 2007

What harms sleep	Effect	Source
A warm, light or noisy bedroom	Heat cuts deep and REM sleep; room light overnight raised insulin resistance; each 10 dB of noise raised the odds of waking by about 35%	Okamoto-Mizuno 2012; Mason 2022; Basner 2018

What helps sleep	Effect	Evidence
A combined programme (regular timing, relaxation, sleep habits, exercise)	Moderate improvement in sleep quality, most in the worst sleepers	Moderate (Murawski 2018)
Regular sleep and wake times	The most regular sleepers had 20 to 48% lower death rates; weekend catch-up did not protect insulin sensitivity	Observational; lab (Windred, Sleep 2024; Depner 2019)
Daylight by day, dim evenings	Brighter days linked to lower mortality and depression; light therapy modestly helps insomnia	Observational; trials (Windred, PNAS 2024; van Maanen 2016)
Regular exercise	Moderate improvement in sleep quality; finish hard sessions at least 4 hours before bed	Moderate (Kredlow 2015; Leota 2025)
Mindfulness, tai chi, slow breathing	Small to moderate improvements in self-rated sleep	Low to moderate (Rusch 2019)
Earlier, regular meals in daylight	May help night owls shift sleep earlier, and help glucose	Low: small trials (Blum 2023)

Small things across the day add up to deeper sleep

From the morning into the night

Morning

- Daylight soon after waking
- Same wake time every day, weekends too

Through the day

- Regular exercise improves sleep quality
- Last coffee about 9 hours before bed

Evening

- Little or no alcohol
- Hard exercise done 4 or more hours before bed
- Dim lights, wind down

In the bedroom

- Cool: about 20 to 25 °C suited older adults best
- Dark: room light overnight raised insulin resistance
- Quiet: each 10 dB of noise raised the odds of waking by about 35%

Adds up to more deep sleep early, more REM late and fewer wakings

Daylight, regular timing and light at night: observational. Exercise, caffeine, temperature and noise: trials or reviews.

These changes suit everyday poor sleep and are good for health in their own right. They are not a substitute for assessment when poor sleep persists, when there is loud snoring or breathing pauses, or when daytime sleepiness affects safety.

CBT-I: what it is and how well it works

CBT-I is a structured programme, usually 4 to 8 sessions, that retrains sleep by working on sleep drive, the body clock and arousal. It is less mysterious than its name suggests: much of it is the advice above, applied in the right order, with weekly checks against a sleep diary.

Part	What it involves	What it works on
Sleep education	How sleep drive, the body clock and arousal work	All three
Sleep restriction	Time in bed matched to the sleep actually being got, with a fixed wake time, then widened by 15 to 30 minutes a week as sleep firms up	Builds sleep drive; deeper, more continuous sleep
Stimulus control	Bed only for sleep and sex; go to bed only when sleepy; if awake for about 20 minutes, get up and do something calm until sleepy; same wake time every day	Breaks the link between bed and lying awake
Cognitive, mindfulness and acceptance work	Working with worry and beliefs such as "I can't cope without 8 hours"; letting go of the struggle to sleep	Lowers arousal
Sleep hygiene	Caffeine, alcohol, exercise, light and the bedroom, as above	Supports the rest, but is not enough on its own
Relapse prevention	A plan for bad nights, stress and travel	Keeps the gains

Which parts matter. A 2024 analysis of 241 trials found the effective parts were cognitive restructuring, mindfulness and acceptance components, sleep restriction and stimulus control, best delivered in person. Sleep hygiene education added nothing on its own, and relaxation training may be slightly counterproductive, though that was uncertain. The best combination needed about 3 people treated for one extra remission compared with education alone (Furukawa, JAMA Psychiatry 2024).

The hard part. Sleep restriction and stimulus control feel counter-intuitive and make people sleepier for the first week or two, which is why coaching matters. Sleep restriction needs extra care in people with bipolar disorder, epilepsy or untreated sleep apnoea, and in those who drive for work.

How well it works	Effect	Evidence
Face-to-face or digital CBT-I	Falls asleep 19 minutes faster; 26 minutes less awake; total sleep up only about 8 minutes. Digital works almost as well, better with support	High (Trauer 2015; Zachariae 2016)
Sleep restriction by practice nurses (4 sessions)	Insomnia severity 3 points lower than a sleep hygiene booklet at 6 months, and cost-effective	High (HABIT, Lancet 2023)
CBT-I or a pill as first treatment	Long-term remission about 41 in 100 with CBT-I against 28 with pills	High (Furukawa, Psychiatry Clin Neurosci 2024)
Adding a pill to CBT-I	Little extra benefit at 6 weeks; moving to CBT-I alone then beat continuing the pill (68 against 42 in 100 in remission at 6 months)	Moderate (Morin, JAMA 2009)

US and European guidelines all put CBT-I first, in person or digital, at any age (Qaseem 2016; Edinger 2021; Riemann 2023). It is not a cure-all: 40 to 57 in 100 reach remission, and people who do not respond need reassessment.

Sleep medicines: benefits and harms

Sleeping pills give small short-term gains and known harms.

Medicine	Benefit	Harms or caution	Source
Z-drugs (zolpidem, eszopiclone, zaleplon)	Fall asleep about 22 minutes sooner than placebo	Lighter sleep with less deep sleep; tolerance within weeks; dependence (see below)	Huedo-Medina, BMJ 2012
Sedatives in adults over 60	1 in 13 sleep better	1 in 6 has a side effect	Glass, BMJ 2005
Melatonin	About 7 minutes faster to fall asleep, 8 minutes more sleep	Generally mild; most useful for body clock problems such as jet lag	Ferracioli-Oda 2013

Medicine	Benefit	Harms or caution	Source
Low-dose doxepin	About 23 minutes more sleep	Similar to placebo in short trials	Cochrane 2018
Daridorexant (orexin blocker)	About 18 to 23 minutes less awake; no rebound up to 12 months	Side effects similar to placebo	Mignot, Lancet Neurol 2022
Quetiapine (off-label)	Not recommended for insomnia	Higher death, dementia and fall rates in older adults	European guideline 2023
Sedating antihistamines (promethazine, doxylamine)	Little evidence of benefit; not recommended by the US guideline	Next-day drowsiness, poorer attention and memory, confusion, constipation and difficulty passing urine, especially in older adults	Sateia 2017
Mirtazapine, low-dose amitriptyline (off-label)	No good trials for insomnia without depression or pain; no evidence at all for amitriptyline	Weight gain, next-day drowsiness and falls; amitriptyline also has strong anticholinergic effects in older adults	Everitt, Cochrane 2018

Known harms of benzodiazepines and Z-drugs. Fracture risk is about 60% higher (Treves 2018), road crash risk more than doubles in the week after starting (Gustavsen 2008), and the US FDA warns of sleepwalking and sleep-driving. Earlier links with higher death rates and dementia largely disappear in better-controlled studies (Patorno 2017; Gray 2016).

Coming off. A mailed booklet explaining the risks and a step-by-step taper got 27 in 100 people aged 65 and over off benzodiazepines in 6 months, against 5 with usual care (EMPOWER 2014). Short, planned courses of Z-drugs have a place; long-term use does more harm than good for most people.

Supplements

Magnesium is the best-tested sleep supplement. The evidence is limited and of low certainty, but points to a small benefit, most likely when diet is low in it. Neither the American nor the European insomnia guideline recommends herbal products (Sateia 2017; Riemann 2023).

Supplement	Best evidence	Our view
Magnesium	12 trials: modest, inconsistent benefits (Lopresti 2026). Fell asleep about 17 minutes faster in older adults (Mah 2021); insomnia severity 1.6 points better than placebo, more with low intake (Schuster 2025)	Limited evidence of a small benefit. Worth trying if intake is low; 350 mg a day or less; avoid in kidney disease
Lavender oil (Silexan, 80 mg)	Two manufacturer-funded trials: better sleep, almost entirely through less anxiety (Seifritz 2019)	Reasonable when worry drives poor sleep
Ashwagandha	5 trials, 400 people: moderate benefit (Cheah 2021)	Not recommended: liver injury cases and a Danish ban
Potassium	One small 1991 study (Drennan 1991)	No good evidence; supplements risk high potassium with kidney disease or some blood pressure medicines

Evidence for L-theanine, kiwifruit, tart cherry, glycine, saffron and probiotics is weak or industry-linked, and valerian and CBD showed no benefit in trials (Bulman 2025; Fernández-San-Martín 2010; Narayan 2024). A 2024 trial reporting large effects of magnesium and potassium in people with diabetes is not reliable: its own comparison between groups was not significant (Khalid 2024). Supplements are not a substitute for CBT-I; where someone wants one, we suggest magnesium and review after four weeks.

Sleep apnoea and sleep care in New Zealand

Sleep apnoea. Symptomatic obstructive sleep apnoea affects about 4 in 100 New Zealand men and 1 to 2 in 100 women (Mihaere, Sleep 2009), and about a third of people with insomnia also have it (Zhang 2019). It must be checked for before sleep restriction or sedatives. CPAP improves sleepiness, quality of life and mood (SAVE, NEJM 2016); CBT-I first adds about an hour of CPAP use a night in people with both (Sweetman 2019); and weight loss, including with tirzepatide, cuts breathing interruptions (Foster 2009; SURMOUNT-OSA 2024).

Sleeping pills in New Zealand. Zopiclone is licensed for up to 4 weeks (Medsafe 2019), yet in 2017/18, 60% of people prescribed it received more than 30 tablets (bpacnz). In 2018, 11.3% of New Zealanders aged 75 and over regularly received a benzodiazepine or zopiclone (HQSC Atlas). Prolonged-release melatonin can be bought from pharmacies by people aged 55 and over since June 2025 (Medsafe). We could not confirm that any orexin blocker is available here.

Access to CBT-I. A free online insomnia course is available through Just a Thought, but face-to-face CBT-I is scarce. Treating insomnia properly could save New Zealand about $21.8 million a year (O'Keeffe, NZMJ 2012).

The PREKURE Clinic approach

CBT-I takes more effort up front than a pill, but works better in the long term, without the risks. A short course of a sleeping pill can be reasonable during a crisis, with an exit plan.

1. **Sleep health for everyone:** coaching on wake time, daylight and dim evenings, screens, exercise, caffeine, alcohol and the bedroom.
2. **CBT-I for chronic insomnia:** for people who struggle three or more nights a week for three months or more despite good habits, delivered by a coach over 4 to 8 sessions, with a digital course where it helps.
3. **Medical assessment:** by a PREKURE doctor, including a sleep diary, the Insomnia Severity Index and screening for sleep apnoea, mood, pain, menopause, alcohol and medicines, with referral for a sleep study where apnoea is likely.

Medicines are used only in short, planned courses, and we support tapering for long-term sleeping pill users. We track insomnia and daytime function scores.

Questions to ask. Could something else be causing my poor sleep? What does CBT-I involve? If I take a sleeping pill, how will I stop?

What the PREKURE Clinic will not claim: that sleep hygiene alone fixes insomnia; that sleeping pills are safe long term; that melatonin is a strong sleep aid; that CBT-I works for everyone; or that sleep trackers improve insomnia.

PREKURE CLINIC

Lifestyle medicine · Metabolic medicine · Behavioural medicine. Online, anywhere in New Zealand.

This page is general information based on published evidence as at November 2026. It is not personal medical advice. Talk with your doctor or a PREKURE Doctor about what is right for you.

© PREKURE 2026

Selected references

Figures were checked against primary sources on 30 October 2026. "Per 100" figures are our arithmetic from published rates. Not yet confirmed: New Zealand availability of orexin blockers, recent NZ insomnia prevalence data, and NZ CBT-I workforce numbers.

Burden

- Ohayon MM. Epidemiology of insomnia. Sleep Med Rev 2002. doi:10.1053/smrv.2002.0186
- Paine SJ et al. Insomnia in New Zealand. Sleep 2004. doi:10.1093/sleep/27.6.1163
- Baglioni C et al. Insomnia and later depression. J Affect Disord 2011. doi:10.1016/j.jad.2011.01.011
- Li X et al. Adherence to a healthy sleep pattern and incident heart failure: 408,802 UK Biobank participants. Circulation 2021. doi:10.1161/CIRCULATIONAHA.120.050792
- Cohen S et al. Sleep habits and susceptibility to the common cold. Arch Intern Med 2009. doi:10.1001/archinternmed.2008.505

- Spiegel K et al. Insufficient sleep duration and antibody response to vaccination: meta-analysis. Curr Biol 2023. doi:10.1016/j.cub.2023.02.017

CBT-I and behavioural treatment

- Trauer JM et al. CBT-I meta-analysis. Ann Intern Med 2015. doi:10.7326/M14-2841
- van Straten A et al. CBT-I components. Sleep Med Rev 2018. doi:10.1016/j.smrv.2017.02.001
- Kyle SD et al. HABIT, nurse-delivered sleep restriction. Lancet 2023. doi:10.1016/S0140-6736(23)00683-9
- Morin CM et al. CBT and zolpidem. JAMA 2009. doi:10.1001/jama.2009.682; sequencing trial, JAMA Psychiatry 2020. doi:10.1001/jamapsychiatry.2020.1767
- Irwin MR et al. CBT-I to prevent depression. JAMA Psychiatry 2022. doi:10.1001/jamapsychiatry.2021.3422
- Qaseem A et al. ACP guideline. Ann Intern Med 2016. doi:10.7326/M15-2175
- Edinger JD et al. AASM behavioural guideline. J Clin Sleep Med 2021. doi:10.5664/jcsm.8986
- Riemann D et al. European insomnia guideline. J Sleep Res 2023. doi:10.1111/jsr.14035

- Furukawa Y et al. Components and delivery formats of CBT-I: systematic review and component network meta-analysis. JAMA Psychiatry 2024. doi:10.1001/jamapsychiatry.2023.5060
- Furukawa Y et al. Initial treatment choices for long-term remission of chronic insomnia: network meta-analysis. Psychiatry Clin Neurosci 2024. doi:10.1111/pcn.13730
- Borbély AA et al. The two-process model of sleep regulation: a reappraisal. J Sleep Res 2016. doi:10.1111/jsr.12371
- Spielman AJ et al. A behavioral perspective on insomnia treatment. Psychiatr Clin North Am 1987. doi:10.1016/s0193-953x(18)30532-x

Medicines

- Glass J et al. Sedatives in older adults. BMJ 2005. doi:10.1136/bmj.38623.768588.47
- Huedo-Medina TB et al. Z-drugs, FDA data. BMJ 2012. doi:10.1136/bmj.e8343
- Patorno E et al. Benzodiazepines and mortality. BMJ 2017. doi:10.1136/bmj.j2941
- De Crescenzo F et al. Network meta-analysis of insomnia drugs. Lancet 2022. doi:10.1016/S0140-6736(22)00878-9
- Mignot E et al. Daridorexant. Lancet Neurol 2022. doi:10.1016/S1474-4422(21)00436-1
- Tannenbaum C et al. EMPOWER deprescribing. JAMA Intern Med 2014. doi:10.1001/jamainternmed.2014.949
- Van Gastel A. Drug-induced insomnia and excessive sleepiness. Sleep Med Clin 2022. doi:10.1016/j.jsmc.2022.06.011
- Everitt H et al. Antidepressants for insomnia in adults. Cochrane 2018. doi:10.1002/14651858.CD010753.pub2

Sleep apnoea and New Zealand

- Mihaere KM et al. Sleep apnoea in Māori and non-Māori. Sleep 2009. doi:10.1093/sleep/32.7.949
- McEvoy RD et al. SAVE trial. NEJM 2016. doi:10.1056/NEJMoa1606599
- Medsafe. Zopiclone for short-term use only, 2019. Prescriber Update
- bpacnz. Zopiclone report; HQSC. Atlas of Healthcare Variation

Sleep architecture and biology

- Institute of Medicine. Sleep physiology. In: Sleep Disorders and Sleep Deprivation. National Academies Press 2006. nationalacademies.org/read/11617/chapter/4

- Ohayon MM et al. Sleep parameters from childhood to old age. Sleep 2004. doi:10.1093/sleep/27.7.1255
- Van Cauter E et al. Age-related changes in slow-wave sleep and REM sleep in men. JAMA 2000. doi:10.1001/jama.284.7.861
- Boulos MI et al. Normal polysomnography parameters in healthy adults. Lancet Respir Med 2019. doi:10.1016/S2213-2600(19)30057-8
- Tasali E et al. Slow-wave sleep and the risk of type 2 diabetes. PNAS 2008. doi:10.1073/pnas.0706446105
- Rasch B, Born J. About sleep's role in memory. Physiol Rev 2013. doi:10.1152/physrev.00032.2012
- Van Cauter E, Plat L. Sleep and growth hormone secretion. J Pediatr 1996. doi:10.1016/S0022-3476(96)70008-2
- Xie L et al. Sleep drives metabolite clearance from the adult brain. Science 2013. doi:10.1126/science.1241224
- Fultz NE et al. Coupled brain activity and cerebrospinal fluid flow in human sleep. Science 2019. doi:10.1126/science.aax5440
- Eide PK et al. Sleep deprivation impairs molecular clearance from the human brain. Brain 2021. doi:10.1093/brain/awaa443
- Miao A et al. Brain clearance is reduced during sleep and anaesthesia. Nat Neurosci 2024. doi:10.1038/s41593-024-01638-y
- Plá V et al. A curious concept of CNS clearance. Nat Neurosci 2025. doi:10.1038/s41593-025-01897-3
- Wrzesień MM et al. Critical review of glymphatic evidence. Front Neurosci 2026. doi:10.3389/fnins.2026.1984401
- van der Helm E et al. REM sleep depotentiates amygdala activity to previous emotional experiences. Curr Biol 2011. doi:10.1016/j.cub.2011.10.052
- Cai DJ et al. REM, not incubation, improves creativity. PNAS 2009. doi:10.1073/pnas.0900271106
- Wagner U et al. Sleep inspires insight. Nature 2004. doi:10.1038/nature02223
- Brunner DP et al. Effects of partial sleep deprivation on sleep stages. Sleep 1993. doi:10.1093/sleep/16.2.100

What disrupts sleep, and what helps

- Ebrahim IO et al. Alcohol and sleep. Alcohol Clin Exp Res 2013. doi:10.1111/acer.12006
- Arbon EL et al. Temazepam, zolpidem and prolonged-release melatonin on sleep. J Psychopharmacol 2015. doi:10.1177/0269881115581963
- Wichniak A et al. Effects of antidepressants on sleep. Curr Psychiatry Rep 2017. doi:10.1007/s11920-017-0816-4
- Gardiner C et al. Caffeine and sleep: meta-analysis. Sleep Med Rev 2023. doi:10.1016/j.smrv.2023.101764
- Zhang L et al. Cigarette smoking and sleep architecture. Am J Epidemiol 2006. doi:10.1093/aje/kwj231
- Okamoto-Mizuno K, Mizuno K. Thermal environment and sleep. J Physiol Anthropol 2012. doi:10.1186/1880-6805-31-14
- Baniassadi A et al. Night-time temperature and sleep in older adults. Sci Total Environ 2023. doi:10.1016/j.scitotenv.2023.165623
- Mason IC et al. Light exposure during sleep and insulin resistance. PNAS 2022. doi:10.1073/pnas.2113290119
- Basner M, McGuire S. WHO review of environmental noise and sleep. Int J Environ Res Public Health 2018. doi:10.3390/ijerph15030519
- Windred DP et al. Personal light exposure and mortality. PNAS 2024. doi:10.1073/pnas.2405924121

- Burns AC et al. Day and night light exposure and psychiatric disorders. Nature Mental Health 2023. doi:10.1038/s44220-023-00135-8
- van Maanen A et al. Light therapy for sleep problems: meta-analysis. Sleep Med Rev 2016. doi:10.1016/j.smrv.2015.08.009
- Windred DP et al. Sleep regularity and mortality. Sleep 2024. doi:10.1093/sleep/zsad253
- Kredlow MA et al. Exercise and sleep: meta-analysis. J Behav Med 2015. doi:10.1007/s10865-015-9617-6
- Stutz J et al. Evening exercise and sleep. Sports Med 2019. doi:10.1007/s40279-018-1015-0
- Leota J et al. Exercise timing and sleep in 14,689 people. Nat Commun 2025. doi:10.1038/s41467-025-58271-x
- Carter B et al. Portable screen-based media device access or use and sleep outcomes: meta-analysis. JAMA Pediatr 2016. doi:10.1001/jamapediatrics.2016.2341
- Perrault AA et al. Reducing evening screen use improves sleep and daytime vigilance in adolescents. Sleep 2019. doi:10.1093/sleep/zsz125
- Peppard PE et al. Longitudinal study of moderate weight change and sleep-disordered breathing. JAMA 2000. doi:10.1001/jama.284.23.3015
- Malhotra A et al. Tirzepatide for obstructive sleep apnea and obesity (SURMOUNT-OSA). NEJM 2024. doi:10.1056/NEJMoa2404881
- St-Onge MP et al. Fiber and saturated fat are associated with sleep arousals and slow wave sleep. J Clin Sleep Med 2016. doi:10.5664/jcsm.5384
- Afaghi A et al. High-glycemic-index carbohydrate meals shorten sleep onset. Am J Clin Nutr 2007. doi:10.1093/ajcn/85.2.426
- Blum DJ et al. Early time-restricted eating advances sleep in late sleepers: pilot randomised trial. J Clin Sleep Med 2023. doi:10.5664/jcsm.10754

- de Mendonça FMR et al. Benzodiazepines and sleep architecture: a systematic review. CNS Neurol Disord Drug Targets 2023. doi:10.2174/1871527320666210618103344

Supplements

- Sateia MJ et al. AASM guideline on medicines for chronic insomnia. J Clin Sleep Med 2017. doi:10.5664/jcsm.6470
- Mah J, Pitre T. Magnesium for insomnia in older adults: meta-analysis. BMC Complement Med Ther 2021. doi:10.1186/s12906-021-03297-z
- Schuster J et al. Magnesium bisglycinate in adults with poor sleep. Nat Sci Sleep 2025. doi:10.2147/NSS.S524348
- Hausenblas HA et al. Magnesium L-threonate and sleep. Sleep Med X 2024. doi:10.1016/j.sleepx.2024.100121
- Drennan MD et al. Potassium affects actigraph-identified sleep. Sleep 1991. doi:10.1093/sleep/14.4.357
- Kasper S et al. Silexan in anxiety-related restlessness and disturbed sleep. Eur Neuropsychopharmacol 2015. doi:10.1016/j.euroneuro.2015.07.024
- Seifritz E et al. Silexan, anxiety and sleep. J Psychiatr Res 2019. doi:10.1016/j.jpsychires.2019.04.013
- Cheah KL et al. Ashwagandha and sleep: meta-analysis. PLoS One 2021. doi:10.1371/journal.pone.0257843
- Lian J et al. Saffron and sleep: meta-analysis. Sleep Med 2022. doi:10.1016/j.sleep.2022.03.001
- Schuster J et al. Saffron extract in moderate insomnia. Sleep Med X 2025. doi:10.1016/j.sleepx.2025.100147
- Bulman A et al. L-theanine and sleep: meta-analysis. Sleep Med Rev 2025. doi:10.1016/j.smrv.2025.102076

- Lin HH et al. Kiwifruit and sleep. Asia Pac J Clin Nutr 2011. europepmc.org/article/MED/21669584
- Kanon AP et al. Kiwifruit and sleep in men. Front Nutr 2023. doi:10.3389/fnut.2023.1079609
- Tucker RM et al. Tart cherry and sleep in adults with overweight or obesity. Nutrients 2024. doi:10.3390/nu16234125
- Zhu K et al. Probiotics and sleep: meta-analysis. Front Psychiatry 2026. doi:10.3389/fpsyt.2026.1769331
- Fernández-San-Martín MI et al. Valerian for insomnia: meta-analysis. Sleep Med 2010. doi:10.1016/j.sleep.2009.12.009
- Narayan AJ et al. Cannabidiol for insomnia: pilot trial. J Clin Sleep Med 2024. doi:10.5664/jcsm.10998

- Khalid S et al. Magnesium and potassium supplementation for insomnia in diabetes. Front Endocrinol 2024. doi:10.3389/fendo.2024.1370733
- Mitchell MD et al. Comparative effectiveness of CBT-I: a systematic review. BMC Fam Pract 2012. doi:10.1186/1471-2296-13-40

- Lopresti AL, Smith SJ, Drummond PD. Magnesium supplementation for sleep in adults: a systematic review of randomised controlled trials. J Diet Suppl 2026. doi:10.1080/19390211.2026.2719670