

WOOL IN THE WORLD

Wool for Wellness

2020





01 *The Science of Sleep*



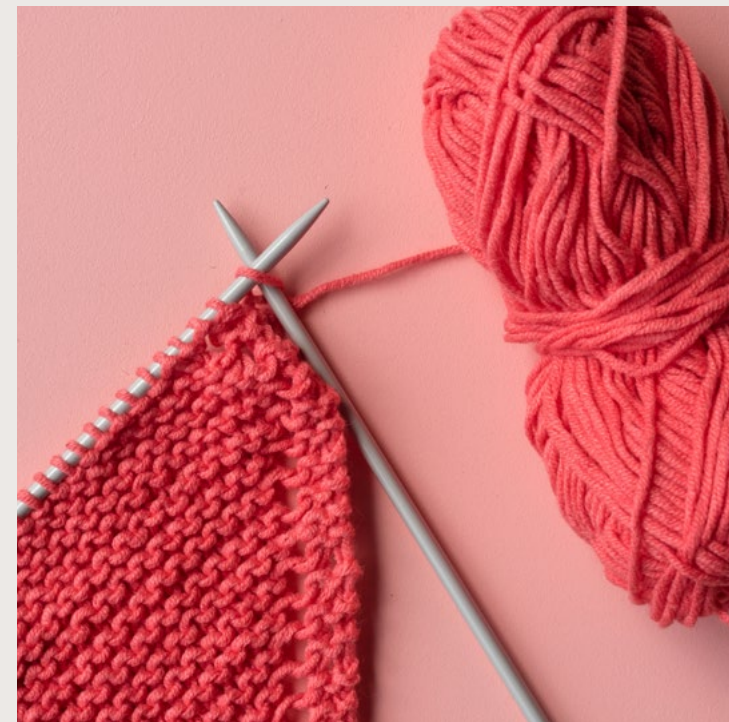
02 *Wool Improves Air Quality*



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In times of uncertainty we turn to comfort and self-care. A beautifully natural fibre, Australia's own Merino wool can help you and your family keep well and feeling good.

Coupled with the fibre's eco-credentials, Merino wool is cementing its rightful place in the health and wellbeing industries.



The Science of Sleep

Falling asleep can be easier than you know.

FAST FACTS

- Newborns sleeping on wool underlays **spend 14% less time making major movements**
- Adults sleeping on wool underlays **sleep more peacefully and wake feeling more refreshed**
- Sleeping in wool apparel in cooler conditions **significantly shortens sleep onset** compared to cotton sleepwear
- Wool blankets demonstrate **better thermal insulation, moisture transport** and moisture buffering than cotton and acrylic blankets

The Science of Sleep

Invest in sleep health and get the most from your waking hours. A good night's sleep has been shown to boost immunity, optimise memory and cognitive function and is important for managing anxiety, so it is worth prioritising.

#1 Babies Sleep Better

Sleeping on woollen underlays helps babies sleep more peacefully. The texture and thermo attributes of wool are thought to reduce stress in sleeping infantsⁱ. Research has shown that newborns sleeping on wool underlays spend 8% less time making minor movements, 14% less time making major movements and are less than half as likely to cry when sleeping on woollen underlays compared to cottonⁱⁱ. Restful sleep promotes healthy growth and sleeping on wool has been shown to positively influence weight gain in under-weight newborns^{iii,iv}.



#2 Adults Sleep Better

Wearing wool sleepwear and using wool bedding and underlays improves the quality of sleep for adults. This is beneficial because sleep quality and the ability to regulate body temperature decrease with age. Wool has superior thermal insulation, moisture transport and buffering properties compared with other fibre types, making it more comfortable to sleep in.



#3 Wool Sleepwear

Adults wearing wool sleepwear have been shown to fall asleep faster and have a less disturbed sleep compared to other fibre types in warm conditions^v. Adults aged 65 and older fell asleep in 12 minutes on average, compared to 22 minutes when wearing polyester and 27 minutes when wearing cotton. In another study, 17 healthy young participants (10 males) were studied under 8 sleeping conditions, consisting of a combination of two temperatures (17°C and 22°C), two sleeping apparel (wool and cotton) and two bedding type (wool and synthetic), after an adaptation night. The study revealed that in cooler conditions sleeping in wool apparel significantly shortened sleep onset compared to cotton sleepwear^{vi}.



#4 Wool Underlays

Adults sleeping on wool underlays sleep more peacefully and wake feeling more refreshed^{vii}. Compared to sleeping on a cotton sheet, wool underlays provide greater diffusion of pressure points, better insulation and better perspiration absorption making it more comfortable^{viii}.



#5 Wool Blankets

The comparative thermo-physiological advantages of wool blankets compared to cotton/acrylic blend blankets have been shown by Umbach^{ix} using laboratory measurements and human sleep studies. The author concluded wool blankets demonstrated better thermal insulation, moisture transport, and moisture buffering than the cotton/acrylic blanket. It was thought that these properties promoted a “refreshing restorative sleep” through increased warmth and reduced loss of heat, positively influencing blood flow, reducing symptoms as circulation increased.

#6 Merino Sleeping Bags for Newborns

A childhood on the family wool-growing property was inspiration for Claire Hausler to create a Merino wool sleeping bag with an innovative design for newborns, under the brand Merineo. The product was tested at a private hospital in Melbourne, with the trials so successful it has now been rolled out to focus on obstetricians. Sourcing 17,5 micron Merino wool from a mill the family farm supplies to, Merineo – a play on the words Merino and Neonate – was born. The pilot program tested the usability of the Merineo on newborn babies, with the majority of parents saying their baby settled better in a Merineo compared to other products.



“Adults wearing wool sleepwear have been shown to fall asleep faster”

Wool Improves Air Quality

A purified home
and workplace.

FAST FACTS

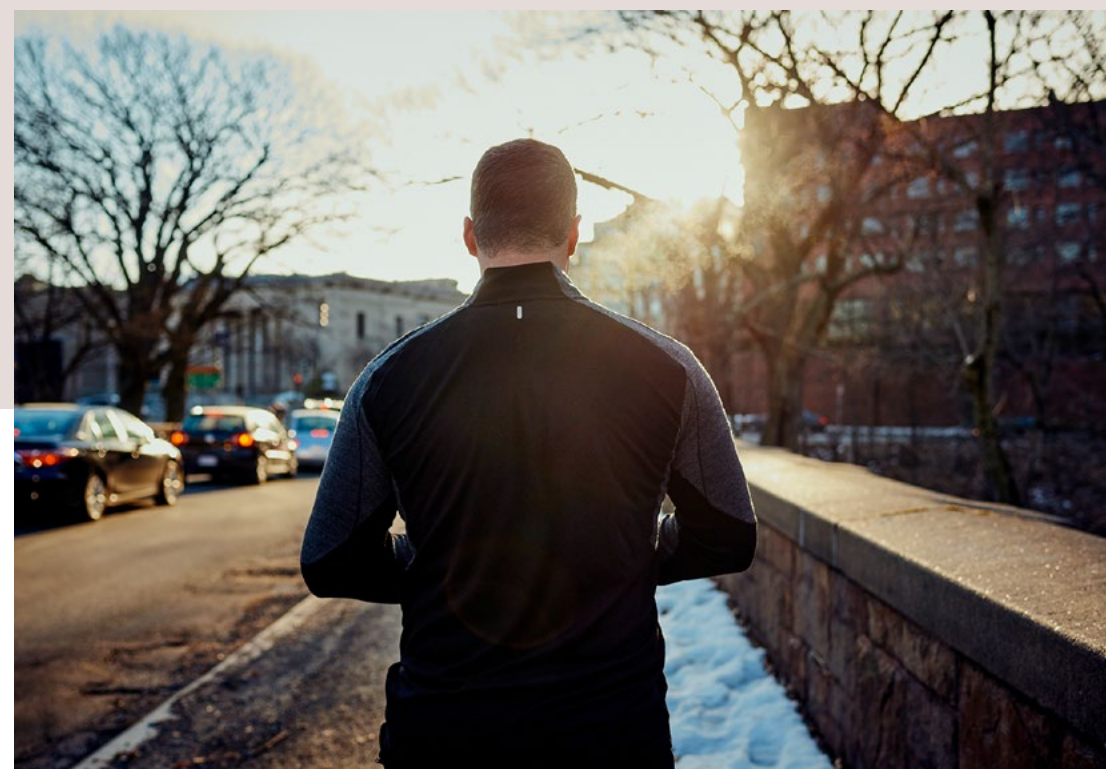
- Wool carpets **improve indoor air quality** by absorbing common pollutants
- Wool carpets **purify the air** for up to 30 years
- In contrast to synthetics, **wool is 100% natural** and as such does not contribute to the microplastic problem

Wool Improves Air Quality

While wool's inherent eco-credentials – natural, renewable, biodegradable – perfectly position it as a more sustainable choice for interior spaces, its many benefits are its drawcard. These include its fire resistance, resilience, easy-care, and wellness attributes, such as temperature regulation during sleep and air purification ability. *As Trend Design Book* recently reported: “the trend for furniture that can improve your health, whether at the home or at the office, looks likely to continue.”

#1 Wool Carpets

Scientific research conducted by CSIRO and AgResearch has revealed wool carpets significantly improve indoor air quality by rapidly absorbing the common pollutants formaldehyde, sulphur dioxide and nitrogen oxides. Wool's complex chemical structure allows it to bind harmful toxic agents from air such as those associated with sick building syndrome, with little or no re-emission of the vapours. In contrast to synthetic carpets, wool carpets may continue purifying the air for up to 30 years.



#2 A Microplastic Solution

A 2019 study by researchers from King's University, using rain as a gauge, found that microplastics are present in the air in London at higher abundances than any other major city examined so far, including Dongguan, China, and Paris, France, with their findings indicating that cities are likely a source of microplastics to the wider environment. Of these, 92% were fibrous microplastics that come from the wearing down of plastic textiles in clothing, upholstery and carpets, in particular petroleum-based fibres, such as polyester. This adds to the findings that some 35% of microplastics found in marine environments are from synthetic clothing.

By contrast, wool is a completely natural fibre, and 100% biodegradable, meaning any fibres that shed during washing or wear breakdown in both marine and terrestrial environments, depositing valuable nutrients back into the soil. And as garments that inherently last and are kept longer than their synthetic counterparts, and being highly recyclable, wool is kept out of landfill.

The Science of Soft

Wool can be good for the skin.

FAST FACTS

- **Wool is not** an allergen
- Superfine Merino wool garments of 17.5 microns or less can help to significantly **reduce eczema symptoms**
- **Wool is an active fibre** that reacts to changes in the body's temperature
- The inherent 3D crimp of wool traps pockets of still air, **insulating the skin**

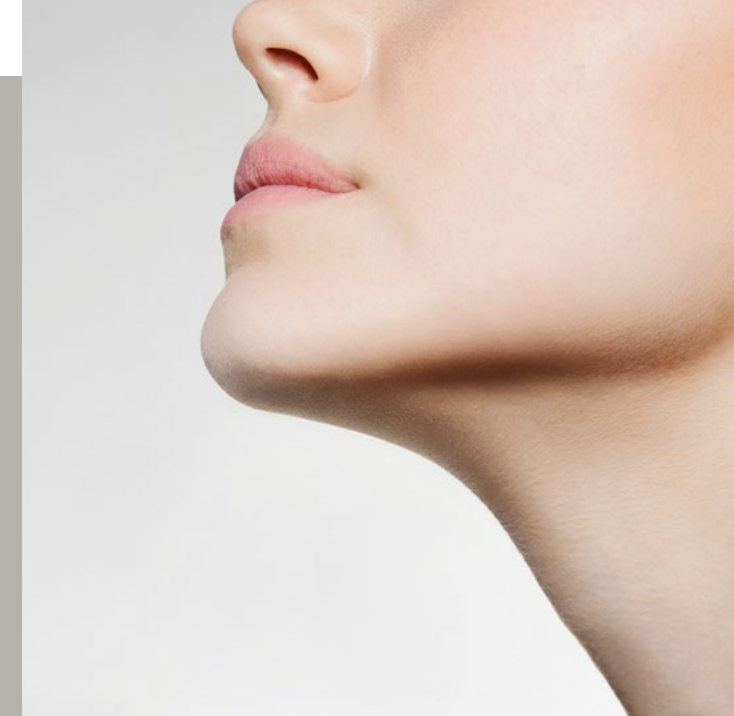
The Science of Soft

In 2016 a highly esteemed group of medical professionals reviewed research over the past 100 years to critically assess scientific studies claiming wool causes allergies. The group published a paper *Debunking the Myth of Wool Allergy* with the primary conclusion that there is no credible evidence wool is an allergen. Even groups with highly sensitive skin have been shown to benefit from wearing superfine Merino base-layer garments.

#1 Wool Can Be Beneficial for Eczema Sufferers

In a major medical breakthrough, wool has been found to be beneficial to the skin, providing a natural adjunct treatment for eczema that reduces the need for traditional medicines. Dermatological trials have shown that adult and infant eczema sufferers who wear superfine Merino wool garments – of 17.5 microns or less – next to the skin have significantly reduced symptoms. Whether it's hot, cold, humid or dry, Merino wool garments are the most breathable of the common apparel types because of wool's ability to absorb and release twice as much moisture vapour as cotton, and 30 times as much as polyester.

When worn next to the skin, superfine Merino wool works as a dynamic buffer, helping to stabilise the humidity levels and temperature of the micro-climate between the fabric and the skin. It appears superfine Merino wool acts like a second skin for people whose 'first' skin is too dry. Four recent dermatology trials have shown that infant, adolescent and adult eczema sufferers have reported reduced symptoms when wearing superfine Merino wool garments next to the skin. They have shown benefits of wearing superfine Merino wool garments with a mean fibre diameter ≤ 17.5 mm for at least 6 hours/day for 6 weeks on the severity and symptoms of Atopic Dermatitis. One study confirmed that wearing Merino wool clothing compared to standard clothing not only provided improvements in the severity of atopic dermatitis, but also improved the quality of life in atopic dermatitis patients.



#2 Live & Breathe

In contrast to synthetics, wool is an active fibre that reacts to changes in the body's temperature, keeping the wearer comfortable. Accordingly, wool garments are one of the most breathable of all the common apparel types. Wool's natural resistance to odour is another key reason why wool wins for activewear. The inherent natural 3D crimp of the wool fibre traps pockets of still air, insulating your skin from the cold environment and keeping you warmer. Wool maintains a drier microclimate next to skin, keeping the wearer warm and dry, while in warm environments, wool fabrics can feel up to two times cooler to touch than synthetic fabrics, because wool conducts more heat away from your skin. When it is hot and dry, wool keeps you cooler, by transferring moisture vapour away from the skin and allowing it to evaporate. Wool fabrics can move 25% more moisture away from your skin than polyester fabrics, equivalent to an ambient temperature drop of up to four degrees Celsius.

#3 Allergen-Free

A highly esteemed group of medical professionals from across the world has reviewed research papers published during the past 100 years to critically assess scientific studies claiming wool causes allergies. The group has now published a paper *Debunking the Myth of Wool Allergy* with the primary conclusion there is no credible evidence wool is an allergen. It found that if a fabric does cause sensations of itch and prickle on the skin then it is because of the large diameter of the fibres and not due to the fibre type being wool. Superfine and ultrafine Merino fibres breed easily, causing minimal or no skin irritation. In comparison, coarse fibres like acrylic and nylon have less tendency to bend, causing skin irritation.



Helping to Protect our Community

Positive actions borne
from a natural fibre.

FAST FACTS

- An electrostatic charge applied to wool blend masks **can assist with dust filtration**
- Merino wool base-layers are being tested by medical staff to help **reduce stress** and **improve the health** of workers
- **First responders have utilised Merino wool** in their uniform designs

Helping to Protect our Community

As widespread use of non-medical masks become common practice, it's timely to consider the softness and comfort of wearing Merino wool. Merino wool fabric is breathable and science has proven it is not an allergen. Innovative manufacturers are making masks with Merino wool for broad use by the public.

#1 Face Masks

The term face mask is a catchall phrase for many different designs, which are fit for different purposes – design elements include factors such as the particulate filtering ability of the material as well as the seal around the nose and mouth. Additionally, the mask can be worn for the wearer's benefit or for the benefit of those around them. However, by providing alternative solutions we can prevent medical masks being taken away from healthcare workers.

Face masks are often simple mechanical filters, however, a significant improvement in dust filtration has been demonstrated through Woolmark-funded research published in 2010, by applying an electrostatic charge to wool/polypropylene blends during manufacture – a positive charge is applied to the wool fibre and negative charge to the polypropylene fibre. This research has shown these filters can be stored for long periods (~2.5 years) without losing their electrostatic charge hence their functionality for dust. Whether this improved filtration performance extends beyond dust to droplets from human secretions is unknown.

Many face masks are designed for single-use but with COVID-19 there is increasing interest in cleaning and disinfecting masks so they can be reused. Wool masks should be hand washed in warm water (no hotter than 40°C) with wool detergent and dried in sunlight. Improved sterilisation may be achieved by spraying the mask with dilute peroxide or hypochlorite-based solutions then rinsing well prior to drying.



#2 Trialling Base-layer Wool for Medical Workers

Wearing superfine Merino wool offers many benefits including breathability and temperature regulation, odour resistance, fire resistance and comfort. AWI (The Woolmark Company's parent company) has undertaken considerable R&D on the next-to-skin benefits of Superfine Merino wool and is now working with an Australian apparel manufacturer to create the best garment for medical staff. Once the trial is under way and feedback on the garments is received from the participants we will refine fabric and design, with view to do a larger wear trial. This trial is part of Royal Prince Alfred Hospital's MDOK initiative to drive cultural and systemic change in health, and reduce stress and burnout among junior and senior doctors.

#3 *Thermals in the Uniforms of First-Responders*

Although the thermo-physiological comfort attributes of Merino wool are well established, further application for the scientific benefits of Merino wool are gaining momentum in first-responders and service personnel protection wear. It is possible that wool's inherent ability to absorb and bind a range of volatile and liquid chemical species could potentially prevent them from reaching the skin, protecting the wearer from toxic combustion products and chemical contaminants. The potential benefits associated with having a hygroscopic fibre in the high humidity next to skin environment fire described in previous scientific research may also benefit wearer in fire and heat protection.



#4 *Fashion for All*

Given 15% of the world's population – or one billion people – live with a physical or mental disability, it makes sense that a global awareness of disability-inclusive development is increasing in areas of education, employment and transport. The fashion industry, however, has been notoriously slow to cater to this large minority population. Open Style Lab (OSL) has pioneered the interdisciplinary thinking required to create considered and inclusive design solutions for the people who benefit from it most. OSL developed a 10-week summer program in partnership with Parsons School of Design, in which specialists in different fields were grouped together to find wearable and stylish solutions for people whose bodies work in a different way.

The garments created as a result of this summer program often have the capacity to enter the market, and there is an especially large window of opportunity. Ageing populations in developing nations are growing faster than any other group; a population for whom buttons, for example, are often wholly unwanted. The program's engagement with the long-term patients from Riverside requires the design teams to focus on mobility and independence, and are specifically "exploring wool fabrics that have properties that can benefit the elderly patients they are collaborating with, such as odour management, breathability, and comfort," revealed Grace Jun, the executive director of OSL.



“Science has proven it is not an allergen”

Wool as Rest and Relaxation

Slowing down with slow fashion.

FAST FACTS

- The rhythmic motion of knitting has been **found to be therapeutic and lower the heart rate**
- Textile art **adds handcrafted and natural elements** to the home



Wool as Rest and Relaxation

There's never been a better time to take time out and find comfort in objects and clothing that is naturally-grown, hand-made and eco-friendly.

#1 *Chores as Mindful Meditation*

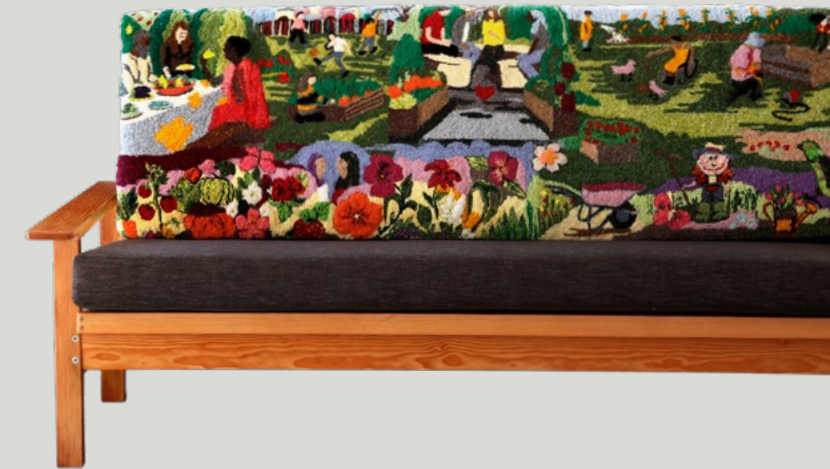
Common housekeeping chores can provide an opportunity to practice appreciating the present moment. Feeling the texture of the wool fabric in your hands as you ready your wool blankets for machine washing, being mindful about our environment and feeling good knowing your wool doesn't contribute to microplastics, whilst a typical 5kg washload of polyester fabrics can release up to 6 million microfibrils into the ocean.



#2 *Knitting for Mental Health and Relaxation*

Knitting has particular benefits, the rhythmic repetitive movements puts us in the present moment. In a world dominated by technology and the growing desire for instantaneous gratification, a counter-culture has emerged during the past few years with a philosophy of slowing down. The art of the handmade, or slow craft movement, continues to rise in popularity as more and more people have a desire to buy artisanal products, or learn to make things themselves. Accessories such as scarves, beanies and gloves have benefited from this trend, as have home furnishings – luscious throws, cosy cushions, woven wall hangings. Yarn crafts are not only admired for their aesthetic beauty, but also for meditative, therapeutic benefits.

Knitters have long acknowledged amongst themselves that knitting is an excellent form of therapy – the repetition is meditative and fuses function with therapy, improving the mental health and wellbeing for those who practice this ancient craft. A study conducted by Harvard Medical School's Mind and Body Institute, found that knitting lowers the heart rate, by an average of 11 beats per minute, and induces an 'enhanced state of calm'. The repetitive movements required to create a pattern release calming serotonin, which can lift moods and dull pain, according to the findings. It has also been found that the hobby can also help fight loneliness and increase a sense of usefulness and inclusion.



#3 *The Tapestry Project*

The conventional story of the refugee is one of boats, detention and visas. But a tapestry work designed and made with the help of 200 refugees tells a very different tale. In vibrant wool yarn, small moments of friendship, healing, strength and community in the Friendship Garden of Auburn have been woven into the fabric of a couch. The idea for the tapestry couch came more than a year ago when master Afghan tapestry artist Sayd Shahmamood Abdali walked into a woodworking workshop that project collaborator Tasman Munro was running at the Auburn garden, wheeling behind him a trolley of his tapestries. With textile artist Jane Theau, Shahmamood Abdali was teaching fellow migrants his unique hook technique – using a needle adapted from a syringe used to inject cows – at the fortnightly community kitchen run by Settlement Services International. Munro suggested a collaboration that brought together the skills of the woodworkers and the tapestry group.

The couch was exhibited alongside Sayd's personal work and those of other refugees at the exhibition *Singular/Plural* at 107 Projects in Sydney during Refugee Week, and continues to be displayed at the Auburn Centre for Community. Co-facilitator Theau said Shahmamood Abdali's technique, akin to that used in hook rugs, was simple and forgiving so people of all skills could be involved. "If people want to see tangible evidence of how to communicate despite not sharing a language, how to create a thing of beauty through collaboration and compromise, and the importance of community projects, they should view this exhibition – from the comfort of this tapestry couch."

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- vi Shin, M., Halaki, M., Swan, P., Ireland, A. H., & Chow, C. M. (2016). The effects of fabric for sleepwear and bedding on sleep at ambient temperatures of 17°C and 22°C. Nature and science of sleep, 8, 121-131. doi:10.2147/NSS.S100271
- vii Dickson, P.R. (1984), The Medical Journal of Australia, January 21, 1984, p87-89.
- viii Kiyak, E., Akdemir, N., Pesci, H. (2010), Australian Journal of Advanced Nursing, 26:3, 47-52.
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