- Lung—diseases / Asthma / Smoking



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Save your breath

Lung disease in females hasn't got the attention it deserves, considering conditions such as asthma and lung cancer hit women differently. The result? Late diagnoses and riskier outcomes. Here's the science behind the discrepancies and how you can protect yourself.

BY NANCY STEDMAN

Take a deep breath and consider the following facts: Lung cancer is more common in women under 55 than in men the same age. Non-smoking females are more likely to be diagnosed with chronic obstructive pulmonary disease (COPD) than non-smoking males. And, among adults, asthma is largely a woman's disease.

There's a pronounced sex difference in lung diseases, and most often that's not in women's favour. And it's a rare thing for lung disease treatment to recognise these variabilities. As with heart disease, it appears that many doctors underdiagnose women with lung issues, and one of the major reasons is that they tend to think of some serious lung conditions as male problems. "Women may present with the exact same symptoms as men, and providers may fail to recognise that their condition is related to lung disease," says interventional pulmonologist Dr Jamie Garfield.

One result is that women are often diagnosed at a more advanced stage of lung disease than are men. Generally, the earlier a condition is diagnosed, the more successful its treatment. So, to protect the health of your lungs, you need to arm yourself with the information that your physicians might not possess. ►

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Females first

Sex differences in our bodies begin early. "Girls walk sooner than boys. They talk sooner than boys. They develop more quickly than boys – which is also true in utero," says Dr Joy Lawn, a paediatrician and professor of maternal, reproductive and child health.

During the last two months of women's pregnancies, girls are about one week ahead of boys in lung development, according to a report in *Nature: Paediatric Research*. For a preterm baby, "the difference of a few days' maturity can mean the difference between having and not having major lung complications," Dr Lawn says.

This headstart newborn girls get is a major reason they have an early edge over newborn boys. "Baby boys are more likely to be born preterm, and even at the same gestational age, boys are more likely to die from preterm birth, especially from more severe lung complications," explains Dr Lawn. "Preterm baby boys who survive are more likely to have long-term disability, including chronic lung disease."

The lungs of both genders contain receptors for sex hormones, and these play a role in the risk of death and lung disease. Male hormones, such as testosterone, can hinder the production of surfactant, a mix of fat, protein and carbs that keeps small airways from sticking together, and female hormones, such as oestrogen, promote surfactant production. In babies, a shortfall of surfactant causes serious lung problems, contributing to boys' disadvantage at birth. (However, babies' early lung complications are mainly driven by lack of maturity, says Dr Lawn.)

At birth, boys do have one lung advantage over girls, however, and it lasts throughout their life: Their lungs and airways (the paths that let air in and out of lungs) are larger, says pulmonologist and women's lung health expert Dr Manuela Cernadas. Adult women's lung volume is about 10 to 12 per cent smaller than that of men of equal height and age. And even when lung sizes are the same, women have narrower airways than men do. This means women have less spare tissue that can function when parts of the lungs are damaged by asthma, lung cancer and COPD.

> Adult women have twice the risk of severe asthma and nearly double the risk of hospitalisation and death compared with men.

Asthma vs oestrogen

About 12 per cent of Australian women currently have asthma, a chronic disease that causes your airways to become inflamed, leading to shortness of breath, wheezing, chest tightening and coughing. If you're one of them, your day-to-day life has been affected by your sex hormones much more than you probably realise. For instance:

≈ **IN CHILDHOOD,** boys are more likely than girls to suffer from asthma, but, after puberty, girls outpace boys.

≈ **GIRLS** who get their periods at a young age are at twice the risk of others of having asthma during young adulthood.

≈ **ADULT WOMEN** have twice the risk of severe asthma and nearly double the risk of hospitalisation and death compared with men.

≈ **OF ASTHMATIC WOMEN,** 30 to 40 per cent show an increase in symptoms either before or during menstruation.

≈ **MOTHERS** who've had a large number of children have higher odds of becoming asthmatic.

≈ **AFTER MENOPAUSE,** asthma rates plateau in women, though they continue to increase in men as they get older.

Here's why sex hormones affect these lifecycle changes: "Androgens such as testosterone are thought to have anti-inflammatory properties, and female sex hormones, especially oestrogen, are thought to be pro-inflammatory," says pulmonologist Dr Joe Zein. Translation: In boys, asthma frequency and severity declines, as they're flooded with male hormones that may



reduce lung inflammation during puberty, but exposure to female hormones in girls at the same time has the opposite effect. Girls and women who are exposed to female hormones for a long time, such as girls who get their periods early and women who have had several babies, are prone to having asthma attacks.

One of many factors explaining why asthma attacks get worse for some women around their periods is the effect of the female hormone progesterone on the hairs (cilia) that move mucus out of the lungs, says Dr Zein. High amounts of progesterone during menstruation reduce the rate at which the cilia beat, leading airways to clog with mucus, making breathing difficult. ►

SOME SYMPTOMS THAT SHOULD MAKE YOU SEE YOUR DOCTOR

- Shortness of breath
- A cough that doesn't go away
- A respiratory infection that doesn't improve with antibiotics
- Wheezing
- Trouble breathing when you exercise or otherwise overly exert yourself
- Chronic phlegm
- Chest pain
- Coughing up blood
- Unintentional weight loss



The smoking factor

If women currently smoke or did in the past, they're more likely to have asthma than comparable men. Similarly, "Women develop lung cancer after less tobacco exposure and at an earlier age than their male counterparts," notes heart surgeon Dr Mara Antonoff.

Cigarettes hit women harder "possibly because they have smaller airways than men, or they metabolise smoke differently because of their hormones, or they may have different inflammatory responses," Dr Cernadas speculates. Lung cancer among those who have never puffed on a cigarette is less common, but, still, 30 per cent of lung cancer deaths among women happen in lifetime non-smokers, says Dr Antonoff.

Why do non-smokers get lung cancer? People can be exposed to hundreds of potentially carcinogenic substances, including second-hand smoke, air pollution and other chemicals. And non-smokers may have some genetic vulnerability. But experts don't know exactly why non-smoking women are more at risk than non-smoking men. The mystery remains unsolved.

Avoiding a misdiagnosis

Lung cancer and COPD have long been thought of as diseases of old men, and that's one of the reasons why doctors may neglect to thoroughly check out women who show up in their clinics with constant coughing, difficulty breathing and similar symptoms. COPD is an umbrella term for lung diseases (including emphysema and

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chronic bronchitis) that obstruct airflow and interfere with breathing. "Women are screened less often for lung cancer and COPD," Dr Garfield notes. What's more, says Dr Cernadas, providers may not recognise that women who smoke are at higher risk. "Research has shown that medical providers do have a bias toward diagnosing men with COPD and women with asthma, and not using spirometry for women," says pulmonologist Dr May-Lin Wilgus. A spirometry test measures how much air you can breathe in and out as well as how fast you can blow air out of your lungs. And emphysema is diagnosed less often in women than in men with the same lung dysfunction, says Dr Cernadas.

Some encouraging news, though: In May 2023, the Australian Government announced the implementation of a National Lung Cancer Screening Program, for commencement by July 2025. At-risk Australians will be able to get a lung scan every two years. However, this is not as helpful for most non-smokers with lung cancer, many of whom don't get diagnosed until Stage IV (the most advanced stage). "It's well demonstrated that work-up and diagnosis for younger women who are non-smokers is often delayed when they have symptoms that may be consistent with lung cancer," Dr Antonoff says.

But even women who do smoke may not be taken seriously when they go to their doctors with breathing problems. "Women may be told that they're simply anxious, that they're having a panic attack," Dr Garfield says. Their symptoms, such as fatigue, may be more subtle, Dr Cernadas notes. Make sure you let your doctor know if you smoke or have smoked, and also bring up any history of lung troubles in your relatives. Non-smokers with a family history of lung cancer are more likely to develop the disease.

Another topic to discuss: what you breathe in during the day. "There's a lung disease for every exposure you can think of," Dr Garfield says. "Do you bake a lot? You're exposed to flour. Do you paint often with oil paints? Their fumes can harm your lungs. What's the air pollution like where you live? Are you in a bushfire-prone area? Are you vaping or smoking marijuana? All these may lead to lung diseases." The goal is for you to communicate clearly with your doctor about all your symptoms, exposures and risks, he adds. "Diagnoses of lung diseases need to be made early, so make sure you're taken seriously."

HOW TO BREATHE EASIER

You can't do much to change your genes or hormones, but you can reduce your odds of developing or worsening a lung disease.

≈ **MAINTAIN A HEALTHY WEIGHT** Obese women are more likely than obese men to develop asthma, says Dr Cernadas. Belly fat, in particular, has been linked to poorer lung function, possibly because it boosts inflammation, which affects the mechanics of breathing, research has found.

≈ **GIVE UP SMOKING** Since second-hand smoke can also cause lung disease, don't let people puff away in your home or office or anywhere near you.

≈ **CONSIDER WEARING A MASK** It might be a good idea, just for when you step out. During the pandemic a few years ago, flares of COPD and asthma plummeted, presumably because of social distancing and mask wearing. This is especially important if you have a chronic lung disease.

≈ **EXERCISE** "Any aerobic workout, even just walking, strengthens your lungs," says Dr Wilgus. Try to do this type of exercise for about half an hour a few times a week.

≈ **OPEN YOUR WINDOWS** Do this whenever you use cleaning products or are painting, advises pulmonologist Dr MeiLan Han. But close them when pollution outside is intense – for instance, during bushfires or backburning or when there's heavy traffic.

≈ **IMPROVE INDOOR AIR WITH A PURIFIER** One with a HEPA filter is best, recommends Asthma Australia, but avoid air filters with an ionising function, as these can actually worsen asthma symptoms.

≈ **EAT MORE FRUIT AND VEGIES** Some evidence suggests that a diet high in fruits and vegetables may help protect against lung cancer in both people who smoke and those who don't. P

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