



Carbon Monoxide Monitoring in Pregnancy Policy

1. Purpose

The purpose of this policy is to offer carbon monoxide (CO) monitoring to all antenatal women who receive care in our maternity services, irrespective of their smoking status. Smoking during pregnancy remains a significant public health concern due to its well-documented adverse effects on both maternal and fetal health ¹¹. Monitoring the level of CO in women's breath at the first pregnancy visit is an immediate and non-invasive biochemical method for helping to identify exposure to CO.

CO is a colourless and odourless gas that is created from combustion or burning of organic matter. Identifying women who are exposed to CO via sources such as tobacco smoke, vaping, passive smoking or environmental factors (e.g. faulty heating appliances; traffic emissions), will positively impact on fetal wellbeing and neonatal outcomes ^{3,4,5}.

CO monitoring in pregnancy is an addition to the existing evidence base and smoking cessation support and resources currently provided to all pregnant women booking to WACHS maternity sites as per the [MR8B WA Handheld Pregnancy Record](#). This policy should be used in conjunction with:

- [National Safer Baby Bundle initiative \(Stillbirth Centre of Research Excellence\)](#)
- [Australian Preterm Birth Prevention Alliance](#)
- [Women and Newborn Health Service \(WNHS\) Guideline October 2023 Management of Nicotine Dependence](#)

2. Policy

2.1 Health Professional Education

All midwives or Aboriginal health professionals (AHPs) working in the antenatal setting are currently required to be appropriately skilled and confident in the management of smoking and vaping in pregnancy and the process for CO monitoring.

It is recommended that antenatal health professionals complete [MyLearning - Carbon Monoxide Screening in the Antenatal Setting \(CMSAS EL2\)](#) to supplement the mandatory training [MyLearning - Brief Advice for Smoking Cessation Declaration \(CL98 EL2\)](#). This will be assigned to relevant staff by their line manager.

The eLearning includes familiarisation with the operation and results interpretation, as well as the cleaning and maintenance of the carbon monoxide (CO) monitor ⁸. The aim of the education package is to increase health professional confidence to engage in sensitive, empathetic and culturally appropriate discussion to support and educate women and their families in reducing CO exposure ^{6, 11}.

The CO measurement is to be used as an additional screening tool to the resources available in the [MR8B WA Handheld Pregnancy Record](#) and will assist in engaging women in discussion on smoking status, avoiding second-hand smoke, and to motivate quitting.

2.2 Antenatal Education and Consent

CO monitors must be available in all antenatal services and monitoring is routinely offered to all women at the first and 36 week antenatal visits irrespective of their smoking status.

It is considered best practice to ask women if they are smokers, and complete the CO monitoring **before** their Nicotine Dependence Assessment in the [MR8B WA Handheld Pregnancy Record](#). This ensures a more accurate reading when the test is conducted at least 10 minutes **after** the woman's last cigarette⁵. Refer to [Appendix A](#) when completing their assessment for reference to carbon monoxide half-life.

All women presenting to a maternity service should be engaged with a comprehensive, holistic approach that is mindful of their physical, spiritual, cultural, emotional and social wellbeing⁶. Explain what the monitor measures and that this service is offered to all pregnant women at the first visit to monitor exposure to CO and that women who smoke or those exposed to second-hand smoke will have higher readings and exposure health risks will be higher.

Appropriately sensitive, respectful discussion for education and consent includes:

- assessment of what the woman knows about CO and fill in the gaps in her knowledge
- explaining what exposure to CO means and the dangers of exposure
- explaining the purpose of including CO monitoring as an additional tool and how these results will provide a physical measure of the level of exposure to CO
- education about how the monitor works
- the potential results
- the potential outcomes for declining the monitoring
- Support services promoting smoking cessation and lifestyle initiatives as per the [MR8B WA Handheld Pregnancy Record](#) offered for smoking and vaping cessation^{6, 9, 11}.

It is essential that the health professional recognises and respects the woman's right to make her own informed decisions if she declines to consent to the test.

2.3 Use of Monitoring Device

CO monitoring is completed using a hand-held carboxymeter CO monitoring device which measures the level of CO in a person's breath, and the amount of CO in an unborn baby's blood, e.g.: [Smokerlyzer®](#) piCO baby™.

Follow manufacturer's instructions for operation, infection control and maintenance. Use of the CO monitor is also in accordance with the [COVID-19 Infection Prevention and Control in WA Healthcare Facilities Guideline](#).

2.4 Interpretation and Explanation of Results

Once the result appears on the screen, refer to the WACHS CO Interpretation Chart and review the results with the woman. The WACHS CO Interpretation Chart ([Appendix B](#)) is divided into three columns:

- CO PPM: parts per million (PPM) - The number of CO molecules in a million parts of air
- %FCOHb: only available on some carboxymeter models. The amount of CO in an unborn baby's blood (percentage of fetal carboxyhaemoglobin)
- Action Plan: recommended actions to be taken given the result.

In discussion with the woman, determine if the result falls into the green, amber or red zone ([Appendix B](#)), discuss the recommended actions dependent on the result and offer and provide screening at **all subsequent** antenatal visits if:

- the pregnant woman currently smokes
- recently quit (<12 months)
- previously smoked
- risk of passive smoking is present or
- Has tested 4 parts per million (PPM) or above at the first antenatal presentation ⁹.

All midwives and AHPs should refer to the Nicotine Dependence Assessment and Nicotine Replacement Therapy Tool in the [MR8B WA Handheld Pregnancy Record](#), and discuss these available smoking cessation resources accordingly.

This is inclusive of services and resources for Aboriginal and Culturally and Linguistically Diverse (CALD) women, to provide culturally safe smoking cessation support (including partners and/or household members) ¹¹.

If the pregnant woman does not smoke but has a carbon monoxide level of greater than 3 ppm, help her to identify the possible source of carbon monoxide and reduce it. Sources could include household or second-hand smoke, heating appliances or traffic emissions.

If the pregnant woman has a high carbon monoxide reading (more than 10 ppm) but says she does not smoke:

- advise her about possible carbon monoxide poisoning
- ask her to contact the Gas Emergency Line (131352) for gas safety advice
- Phrase any further questions about smoking sensitively to encourage an open and honest discussion.

2.5 Documentation

The expired CO reading, support offered and any referrals or clinical plans made are to be recorded in the woman's [MR8B WA Handheld Pregnancy Record](#) and medical record.

2.6 Compliance

This policy is aligned to the [Health Services Act 2016](#) and is required to implement in practice the requirements of the National Safer Baby Bundle initiative and selected components of the [MP 0158/21 Smoke Free Policy](#) pertaining to services delivering adult inpatient services.

Policies are designed to provide staff with evidence-based recommendations to support appropriate actions in specific settings and circumstances. As such, WACHS policies should be followed in the first instance. In the clinical context, where a patient's management should vary from an endorsed WACHS policy, this variation and the clinical opinion as to reasons for variation must be documented in accordance with the [Documentation Clinical Practice Standard](#).

WACHS staff are reminded that compliance with all policies and procedures is mandatory.

3. Roles and Responsibilities

District Directors are responsible for:

- ensuring that all health professional providing antenatal care have access to this policy
- Ensuring compliance with this policy.

Maternity Managers are responsible for ensuring site awareness of the Carbon Monoxide Monitoring in Pregnancy Policy and assigning and supporting relevant staff providing antenatal care to undertake the recommended education [MyLearning - Carbon Monoxide Screening in the Antenatal Setting \(CMSAS EL2\)](#).

Antenatal health professionals are responsible for:

- having knowledge and understanding of the Carbon Monoxide Monitoring in Pregnancy Policy to ensure the best possible outcome for the patient
- working within their credentialed scope of practice in their assessment, management and transfer of care
- Ensuring that they are competent completing CO monitoring, interpreting results and subsequent education to women and their families.

All staff are required to comply with the directions in WACHS policies and procedures as per their roles and responsibilities. Guidelines are the recommended course of action for WACHS, and staff are expected to use this information to guide practice. If staff are unsure which policies procedures and guidelines apply to their role or scope of practice, and/or are unsure of the application of directions they should consult their manager in the first instance.

4. Monitoring and Evaluation

Maternity managers will monitor compliance via reviewing:

- the percentage of health providers completing [MyLearning - Carbon Monoxide Screening in the Antenatal Setting \(CMSAS EL2\)](#)
- the uptake percentage and determination of completion of CO screening in the antenatal settings
- all complaints received from women, families and health providers involving the use of CO monitoring
- Audit outcomes of compliance, correct use of, and evaluation of the feedback and effectiveness of the introduction of the CO monitoring.

This policy will be evaluated by the Obstetric Leadership Group and Midwifery Advisory Forum to determine the effectiveness, relevance and currency. The efficiency and overall usefulness of CO monitoring will occur through continuous evaluation and review of audit outcomes as per the monitoring activities above.

5. References

1. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (2020). "Substance use in Pregnancy (C-Obs 53)." [Internet]. Accessed 31/03/2026. Available from: <https://ranzcoq.edu.au/womens-health/statements-guidelines/>
2. Australian Institute of Health and Welfare (2022). "Australia's mothers and babies – Smoking During Pregnancy." [Internet]. Accessed 31/03/2026. Available from:

<https://www.aihw.gov.au/reports/mothers-babies/australias-mothers-babies/contents/antenatal-period/smoking>

3. The Centre of Research Excellence in Stillbirth (2023). "The Safer Baby Bundle." [Internet]. Accessed 31/03/2026. Available from: <https://stillbirthcre.org.au/about-us/our-work/the-safer-baby-bundle/>
4. Australian Preterm Birth Prevention Alliance (2023). "Clinical Guidelines." [Internet]. Accessed 31/03/2026. Available from: <https://www.pretermalliance.com.au/Our-Research/Clinical-Guidelines>
5. State of Queensland (Queensland Health) (2021). "Carbon Monoxide Monitoring for Smoking Management. A brief guide for staff – Statewide Respiratory Clinical Network." [Internet]. Accessed 31/03/2026. Available from: <https://www.health.qld.gov.au/search?query=Carbon+Monoxide+Monitoring+for+Smoking+Management.+A+brief+guide+for+staff+%E2%80%93+Statewide+Respiratory+Clinical+Network>
6. NSW Government (2022). "Reducing the effects of smoking and vaping on pregnancy and newborn outcomes." [Internet]. Accessed 31/03/2026. Available from: https://www1.health.nsw.gov.au/pds/Pages/doc.aspx?dn=PD2022_050
7. NSW Ministry of Health (2024). "For the Management of Substance Use in Pregnancy, Birth and the Postnatal Period – Clinical Guideline." [Internet]. Accessed 31/03/2026. Available from: <https://www.health.nsw.gov.au/aod/resources/Pages/substance-use-pregnant-parenting.aspx>
8. Bedfont® Scientific Ltd (2023). "piCO^{baby}™ Smokerlyzer® Range – User Manual." [Internet]. Accessed 31/03/2026. Available from: <https://resources.bedfont.com/pico-picobaby-micro-manuals/>
9. National Institute for Health and Care Excellence (Nice) (2023). "Tobacco: preventing uptake, promoting quitting and treating dependence". [Internet]. Accessed 31/03/2026. Available from: <https://www.nice.org.uk/guidance/ng209/chapter/Treating-tobacco-dependence-during-pregnancy-and-in-the-first-year-after-childbirth>
10. Pan, K.T., Leonardi, G.S., Ucci, M., Croxford, B. (2021). "Can Exhaled Carbon Monoxide Be Used as a Marker of Exposure? A Cross-Sectional Study in Young Adults". International Journal of Environmental Research and Public Health. [Internet]. Accessed 31/03/2026. Available from: <https://www.mdpi.com/1660-4601/18/22/11893#:~:text=The%20average%20baseline%20exhaled%20CO%20concentration%20was%206.9,smokers%20and%20heavy%20smokers%20in%20the%20smoking%20group.>
11. Australian Living Evidence Collaboration. (2025). Australian Pregnancy Care Guidelines. [Internet]. Accessed 31/03/2026. Available from: <https://app.magicapp.org/?language=und#/guideline/jm83RE>
12. RACGP Supporting Smoking Cessation: A Guide for Health Professionals
13. RANZCOG Smoking Cessation in Pregnancy and Breastfeeding (Quit Victoria) Endorsed Clinical Guideline
14. Fiona Stanley Hospital (FSH) Carbon Monoxide Monitoring and Nicotine Replacement Therapy in Pregnancy

6. Definitions

Term	Definition
Carbon Monoxide	Carbon Monoxide: a colourless, odourless gas that is created from combustion or the burning of organic matter. Sources of CO include smoke from a cigarette,

	joint, bong, fire or BBQ, exhaust fumes from a vehicle or a leak from a faulty gas appliance
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7. Document Summary

Coverage	WACHS
Audience	Clinical
Records Management	Clinical: Health Record Management Policy
Related Legislation	Health Services Act 2016
Related Mandatory Policies / Frameworks	Smoke Free Policy WA MP 0158/21 Public Health Framework
Related WACHS Policy Documents	Detection and Management of Fetal Growth Restriction (FGR) Policy
Other Related Documents	National Tobacco Strategy 2023 – 2030 Western Australian Health Promotion Strategic Framework 2022 - 2026 WA Health Guidelines for the Implementation of the Smoke-Free Policy WNHS Guideline October 2023 Management of Nicotine Dependence FSH CO Monitoring and Nicotine Replacement Therapy in Pregnancy
Related Forms	<ul style="list-style-type: none"> • MR8B WA Handheld Pregnancy Record
Related Training	Available from MyLearning : <ul style="list-style-type: none"> • MyLearning - Brief Advice for Smoking Cessation Declaration (CL98 EL2) • MyLearning - Carbon Monoxide Screening in the Antenatal Setting (CMSAS EL2) • Bedfont® Scientific Ltd - Resources www.bedfont.com
Aboriginal Health Impact Statement Declaration (ISD)	ISD Record ID: 2859
National Safety and Quality Health Service (NSQHS) Standards	1.07, 1.15, 1.16,1.20, 2.04, 2.06, 2.10, 3.08, 3.10, 3.13, 5.10-5.14, 6.03, 6.11.
Aged Care Quality Standards	Nil
Chief Psychiatrist's Standards for Clinical Care	Nil
Other Standards (please specify and include link)	Nil

8. Document Control

Version	Published date	Current from	Summary of changes
1.00	23 June 2026	23 June 2026	New policy developed to provide support when offering and performing carbon monoxide monitoring to pregnant women. Carbon monoxide monitoring to be used as a tool to supplement the current overall quit smoking interventions provided by WACHS maternity health professionals.

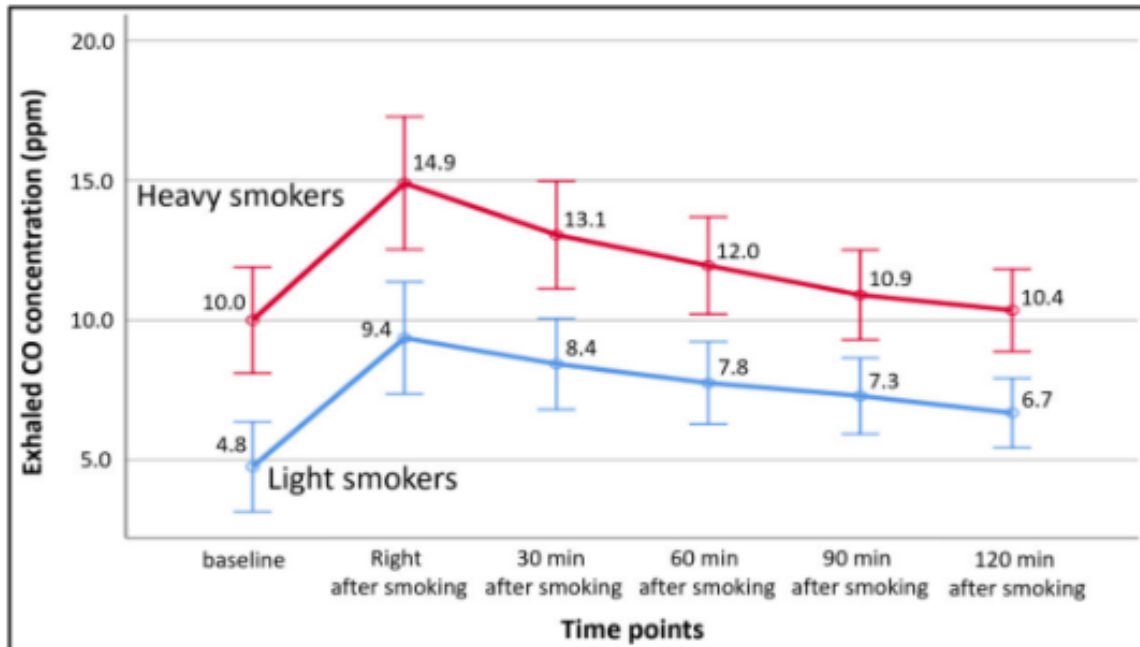
9. Approval

Policy Owner	Executive Director Nursing and Midwifery Services
Co-approver	Executive Director Clinical Excellence
Contact	WACHS Coordinator of Midwifery
Business Unit	Midwifery
EDRMS #	ED-CO-23-465750
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This document can be made available in alternative formats on request.

Appendix A: Carbon Monoxide Half Life ⁽¹⁰⁾

Figure 1. Exhaled CO concentration for light smokers and heavy smokers at different time points. Error bar—means \pm 95% CI (Confidence Interval).



Reference: Pan, K.-T., Leonardi, G. S., Ucci, M., & Croxford, B. (2021). Can Exhaled Carbon Monoxide Be Used as a Marker of Exposure? A Cross-Sectional Study in Young Adults. *International Journal of Environmental Research and Public Health*, 18(22), 11893. <https://www.mdpi.com/1660-4601/18/22/11893#:~:text=The%20average%20baseline%20exhaled%20CO%20concentration%20was%206.9,smokers%20and%20heavy%20smokers%20in%20the%20smoking%20group>

Appendix B: WACHS CO Interpretation Chart

COppm	%FCOHb	Action Plan
0 - 3	0.00 – 0.85	<ul style="list-style-type: none"> • Discuss the results and explain this result is normally that of a non-smoker • Complete Nicotine Dependence Assessment • Monitoring is not offered again routinely until the 36 weeks visit or unless circumstances change • If the woman has recently quit smoking or is at risk of passive smoking, advice is to continue to offer CO monitoring at each visit • If a smoker, offer options as below
4 - 6	1.13 – 1.70	<ul style="list-style-type: none"> • Discuss the results • Complete Nicotine Dependence Assessment • Sensitive discussion about risks of smoking in pregnancy • Offer support services promoting smoking cessation and lifestyle initiatives as per the MR8B West Australian Handheld Pregnancy Record • Continue to offer CO monitoring at each visit • If any other risk factor, refer to Antenatal Doctors Clinic • Ensure woman who smoke have regular growth & wellbeing ultrasounds prescribed • Ensure woman who deny smoking and have two high readings over two appointments have an Antenatal Doctor Clinic appointment
7 - >20	1.98 – 5.66	<ul style="list-style-type: none"> • Discuss the results • Complete Nicotine Dependence Assessment • Sensitive discussion about risks of smoking in pregnancy • Offer support services promoting smoking cessation and lifestyle initiatives as per the MR8B West Australian Handheld Pregnancy Record • Continue to offer CO monitoring at each appointment • If any other risk factor, refer to Antenatal Doctors Clinic • Ensure woman who smoke have regular growth & wellbeing ultrasounds prescribed • Ensure woman who deny smoking and have two high readings over two appointments have an Antenatal Doctor Clinic appointment

Reference: [FSH CO Monitoring and Nicotine Replacement Therapy in Pregnancy](#) ¹⁴
(modified table for WACHS)