Smoking Cessation and Carbon Monoxide Testing for pregnant women/birthing people and their partners

University Hospitals of Leicester NHS Trust

Trust ref: C110/2008

Contents

1. Introduction and Who Guideline applies to

1.1 Smoking in pregnancy background

Smoking during pregnancy has serious consequences on the health of the child. Smoking can lead to an increased risk of miscarriage, premature birth, stillbirth and low birth weight babies which lead to a higher infant mortality rate. There is strong evidence that reducing smoking in pregnancy reduces the likelihood of stillbirth. Mothers who stop smoking completely will benefit from a decreased risk of miscarriage, stillbirth, ectopic pregnancy and placental complications, pre-term rupture of membranes, premature birth, low birth weight and a reduction in the risk of Sudden Infant Death Syndrome (SIDS). A universal approach to smoking cessation in pregnancy will help to deliver smoke free pregnancies, smoke free housing and smoke free childhoods. This evidence-based guideline aims to support community and hospital based midwives and maternity support staff to identify pregnant women/birth people who smoke and ensure they are offered pathways that supports them to quit and prevent relapse.

Table 1: Smoking Pregnancy Challenge Group. Review of the Challenge, 2018

	Maternal Smoking	Second-hand Smoke
Low birth weight	Average 250g lighter	Average 30-40g lighter
Still birth	Double the likelihood	Increased risk
Miscarriage	23-32% more likely	Possible increase
Preterm birth	27% more likely	Increased risk
Heart defects	50% more likely	Increased risk
Sudden Infant Death	3 times more likely	45% more likely

1.2 This guideline applies to all women/birth people who smoke and are:

1. Planning a pregnancy
2. Already pregnant
3. Partners of pregnant women/birth people who smoke
4. In the postnatal period

This guideline is for all users who provide health and support services to pregnant women/birth people including but not limited to:

Midwives and maternity support workers.
Obstetricians, sonographers, paediatricians/neonatologists.
GP's, practice nurses, health visitors, family nurses.

2. Guideline Standards and Procedures

2.1 Aims

The aim of this guideline is to ensure compliance with national and local policies and strategies in relation to smoking cessation in pregnancy. Furthermore, it aims to enhance all roles within maternity care in promoting public health messages and interventions. This guideline acknowledges the NHS Long Term Plan, National Institute for Health and Care Excellence (NICE) guidelines regarding smoking cessation in pregnancy including: 'Antenatal Care: Routine Care for the Healthy Pregnant Women', 'NICE Smoking Cessation in Secondary Care: Acute, Maternity and Mental Health, 'NICE Smoking: Stopping in Pregnancy and After', 'NICE Tobacco: preventing uptake, promoting quitting and treating dependence', and also acknowledges the 'Saving Babies Lives Care Bundle for Reducing Still Birth Version 2'.

2.2 Recommendations

Medical staff should use every point of contact during the maternity care pathway as an opportunity to establish and record a pregnant woman's/birthing persons smoking status. The medical professional should ask women/birthing people if the pregnant woman/birthing person smokes (carry out Very Brief Advice; VBA), carry out Co monitoring, prescribe nicotine replacement therapy (NRT) and make an opt- out referral to stop smoking services.

Maternity staff in the community setting, e.g., the community midwifery team, can refer a pregnant smoker and their partner to local authority stop smoking services using the following contact details:

livewell@leicester.gov.uk (if pregnant women/birth people are based in Leicester City) or the referral form on the LiveWell website (https://leicslivewell.referral.org.uk/selfrefer)

quitready@leics.gov.uk (if pregnant woman/birth person is based in Leicestershire/Rutland)
maternitycureuhl@uhl-tr.nhs.uk (if unsure of pregnant woman's/birth persons location)

Maternity staff based in the hospital, for example those seeing pregnant women/birth people in clinic settings, can refer a pregnant woman/birth person and their partner to the new in-house stop smoking service, called the Maternity CURE Team, by emailing maternitycureuhl@uhl-tr.nhs.uk

All maternity staff seeing pregnant women/birth people as inpatient admissions can establish and record a pregnant woman's/birth persons smoking status on nervecentre under the VTE assessment. A detailed description of the new smoking in pregnancy pathways are shown in Appendix 1 and additional contact details in Appendix 2.

2.3 Delivering VBA: Very Brief Advice

Very brief advice (VBA) on smoking is an evidence based intervention proven to prompt quit attempts. It is designed to be delivered to all pregnant smokers seen by any clinician, whether as an inpatient admission or community appointment. VBA involves establishing the smoking status of all pregnant and post-partum women/birthing people, advising on the best method of stopping for women/birthing people who are current or recent smokers, and acting to support stopping by referring women/birthing people to specialist tobacco dependence treatment services.

Table 2: VBA actions and narrative

	Action	Narrative to patient
Ask	Ask and record the smoking status	"Do you smoke, or have you ever smoked in the past two weeks?"
	Ask about partners or other members of the household who smoke Record on E3/nervecentre	"Are you currently using any nicotine replacement therapy of vapes?" "How many cigarettes a day do you usually smoke? Is that always the same or do you sometimes smoke more of less?" "Has your smoking changed since you discovered that you are pregnant?" "Does your partner smoke?"
Advise	Identify pregnant smokers using CO monitoring as described in section 3. Advise pregnant women/birthing people of risks of smoking for both mum and baby and the importance of quitting, especially early in pregnancy but also at any point during the pregnancy. Advise pregnant women/birthing people that help is available to manage stop smoking whilst in hospital or attending antenatal appointments.	"Smoking during pregnancy or exposure to second-hand smoke can result in major problems to both yourself and your baby. You are more likely to have a miscarriage during pregnancy and a difficult labour. Your baby is more likely to have problems with their heart and lungs." "Stopping smoking will have positive benefits to both you and your baby including reduced problems in labour, increased birth weight, and reduced chance of behavioural, mental and physical problems for child later on in life." "Carbon Monoxide is a poisonous gas and is very harmful to your baby. It is present in exhaust fumes, faulty gas appliances and cigarette smoke. It passes via your bloodstream to your baby and deprives your baby of oxygen and nutrients. It also slows the baby's growth and development. Fortunately, CO levels return to normal very quickly once someone stops smoking." "As part of routine maternity care package, we measure the CO level in your bloodstream. It is a simple breath test and we can give you the results immediately. This machine will measure the amount of carbon monoxide in your lungs in parts per million."

Act	Act on the smoking status and CO reading by making an opt-out referral to either the community stop smoking services or inpatient stop smoking service (both can be carried out by emailing the maternity cure email address). If the pregnant woman/birthing person refused the referral; remind the woman/birthing person about the problems associated with smoking in pregnant and the hospital no smoking policy. Advise pregnant woman/birthing person on different types of nicotine replacement therapy Document what action has been taken on E3/Nervecentre	"It looks like your CO reading is positive so I will make a referral to a specialist stop smoking advisor to help you quit smoking during your pregnancy. This specialist will contact you within the next 24 hours and make an appointment with you within five days." "To make your stay at hospital more comfortable, we are going to prescribe you some nicotine replacement therapy. The hospital has a no smoking policy. As part of the maternity care package we provide here at UHL, a stop smoking advisor will be visiting you today to provide extra support." "Do you have any questions?"

2.4 CO Monitoring

Carbon Monoxide (CO) is a toxic, odourless, colourless and tasteless gas. It is formed by the incomplete combustion of organic material at high temperatures, with an insufficient oxygen supply. When inhaled, CO displaces oxygen in the bloodstream to form carboxyhaemoglobin (COHb). This starves body tissue of oxygen restricting the body's performance with other significant health implications. CO can remain in the bloodstream for up to 24 hours.

Some pregnant women/birthing people find it difficult to admit that they smoke, or knowingly or unknowingly, minimise the amount the actually smoke. This, in turn, makes it difficult to ensure that they are offered appropriate advice and support. A CO assessment using a CO monitor is an immediate and non-invasive biochemical method for helping to assess whether or not someone smokes by measuring the CO levels in a pregnant woman's/birthing persons breath. Therefore, the ambition in Leicester is for CO monitoring to become a standard routine assessment at every appointment and point of contact with a pregnant woman/birthing person.

It is important to note that CO quickly disappears from expired breath (the level can fall by 50% in less than 4 hours). As a result, low levels of smoking may go undetected and may be indistinguishable from passive smoking. When trying to identify pregnant women/birthing people who smoke, it is best to use a low cut-off point to avoid missing someone who may need help to quit. The locally agreed cut off point is a reading of 4ppm, so any reading above 4ppm will be classed as a high-risk factor, and a referral should be made to the local specialist smoking cessation service.

If a CO reading is raised >4ppm, and for those with an exceptionally high CO rate > 15, try and ascertain the likely reason for the raised level by discussing the ways CO can enter the system.

Raised CO can be detected in non-smokers which may be the result of exposure to passive smoking at home/work, environmental exposure such as a faulty boiler or diesel fumes or

lactose intolerance. Certain medications, e.g., some antidepressants, some drugs for epilepsy, use of chewing gum, toothpaste and mouthwash before taking the test and diabetes can also cause high CO readings.
Other reasons include smoking another substance e.g. cannabis, shisha, bidi or paan.

If a reason cannot be ascertained, and/or any symptoms that may be related to CO poisoning; tension type headache, dizziness, sickness, tiredness and confusion, stomach pains, shortness of breath/breathing difficulty, 'flu' like symptoms (unlike flu, CO does not cause a high temperature) are experienced, it is strongly recommended that the patient seeks medical attention at a local A&E service and should be advised to call the free Health and Safety Executive Gas Safety advice line on 0800 300 363.

The CO monitor is a handheld, non-invasive method to determine CO levels in the patient's breath. The D-piece is a one-way valve to prevent air being drawn back from the monitor. The steribreath mouth pieces are single use cardboard/plastic tubes which attach to the D- piece for infection control. Any issues with your CO monitor, D-piece or mouthpieces can be escalated to your manager, Emily Wakelin (community matron), Beverley Cowlishaw (Public Health Midwife) or the stop smoking advisors.

CO Monitor: An easy to use hand-held and non-invasive monitor for the testing of patients to determine the level of Carbon Monoxide (CO) in the breath. 	**D-Piece:** A one-way valve to prevent air being drawn back from the monitor. The breath then passes through an infection control filter, proven to remove and trap >99.9% of airborne bacteria.	**SteriBreath Mouthpieces:** Single-use plastic tubes that attach to the D-piece, combining ease of use with optimum infection control. 

Procedure for using a CO monitor:

1. Attach the 'D-piece' and a new, unused 'SteriBreath mouthpiece'.
2. Turn on the monitor by pressing and holding the power button on top of the machine.
3. Press the 'breath test' symbol on screen
4. Ask the patient to inhale and hold their breath for 15 seconds. A beep will sound during the last three seconds of the countdown.
5. Ask the patient to blow slowly into the mouthpiece, aiming to empty lungs completely.
6. The ppm and equivalent %COHb and/or %FCOHb levels will rise and stay on the screen.
7. When the test has finished, the 'home' and 'music note' icon will appear at the bottom of the screen. If a high reading has been recorded, you can mute the sound by pressing the 'music note' icon.
8. To repeat the breath test, press the 'home' icon once to return to the home screen and repeat steps 3-7.
9. Remove and discard the Steribreath mouthpiece
10. Remove the D-piece between tests to diffuse the sensor with fresh air.
11. To switch the machine off, press and hold the power button for 3 seconds. The machine will also power off after 2 minutes of inactivity to save power.

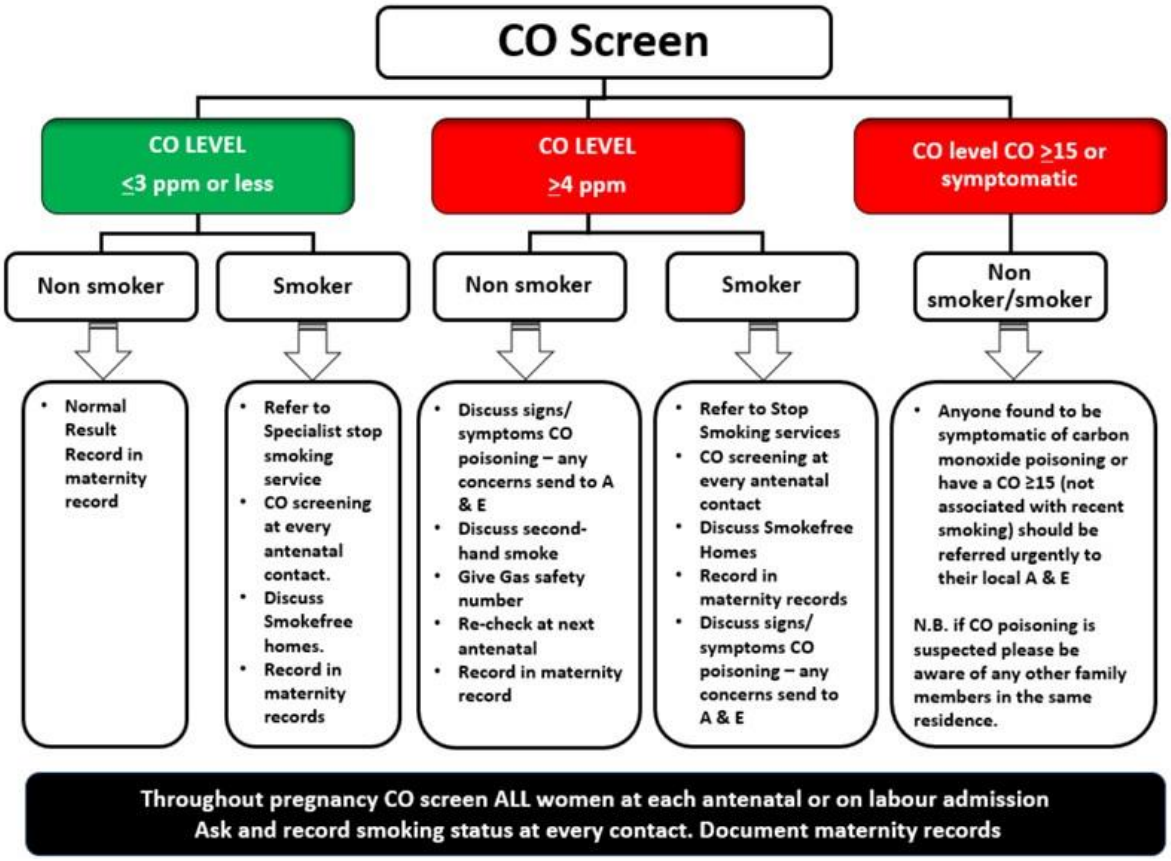
Interpreting CO monitor results:

It is beneficial for the patient to understand what each result means. The chart provided with the CO monitor can be a valuable visual tool. The CO (ppm) reading relates to the amount of poisonous CO that has been inhaled). The CO carboxyhaemoglobin (%COHb) and foetal

carboxyhaemoglobin (%FCOHb) readings relate to the percentage of vital oxygen that has been replaced in the bloodstream.

The higher the reading, the higher the risk:

Traffic light colour	Description	Reading (ppm)	
		piCO™ & Micro⁺™	piCO^baby™
Green	Non-smoker	0-6	0-3
Amber	Borderline	7-9	4-6
1 Red	Smoker – low addicted	10-15	7-10
2 Red	Smoker – moderately addicted	16-25	11-15
3 Red	Smoker – heavily addicted	26-35	16-25
3 Red Flashing	Smoker – very heavy addicted	36+	26+



If a reason cannot be ascertained, and/or any symptoms that may be related to CO poisoning; tension type headache, dizziness, sickness, tiredness and confusion, stomach pains, shortness of breath/breathing difficulty, 'flu' like symptoms (unlike flu, CO does not cause a high temperature) are experienced, it is strongly recommended that the patient seeks medical attention at a local A&E service and should be advised to call the free Health and Safety Executive Gas Safety advice line on 0800 300 363.

If the high CO reading is related to the patients smoking status, very brief advice should be followed and the patient referred to stop smoking services.

2.5 Stop smoking referral pathways

All women/birthing people who fit the referral criteria (detailed below) should be referred in an "opt-out" basis to local or in-house stop smoking services, regardless of their stage in the pregnancy. Those who deny stop smoking help should still be referred to stop smoking services for a specialist stop smoking conversation. It is best practice to explain the pathway of care to patients so they are aware that a stop smoking advisor will contact them within 24 hours and a stop smoking appointment will be made within 5 days.

Referral criteria:

1. All smokers including shisha users
2. All individuals with raised CO readings of >4 ppm
3. Individuals who have spontaneously quit or recently quit within the last two weeks (due to risk of relapse)
4. Users of vapes/e-cigarettes
5. Cannabis users

Maternity staff in the community settings, e.g. the community midwifery team, can refer a pregnant smoker and their partner to local authority stop smoking services using the following contact details:

livewell@leicester.gov.uk (if pregnant woman is based in Leicester City) or the referral form on the LiveWell website (https://leiclivewell.referral.org.uk/selfrefer)
quitready@leics.gov.uk (if pregnant woman/birthing person is based in Leicestershire/Rutland)
maternitycureuhl@uhl-tr.nhs.uk (if unsure of pregnant woman's/birthing persons location)

Maternity staff based in the hospital seeing pregnant women/birthing people in clinic settings can refer a pregnant woman/birthing person and their partner to the new in-house stop smoking service, called the Maternity CURE Team, by emailing maternitycureuhl@uhl-tr.nhs.uk

All maternity staff seeing pregnant women/birthing people as inpatient admissions can establish and record a pregnant woman's/birthing persons smoking status on nervecentre under the VTE assessment. A detailed description of the new smoking pregnancy pathways is shown in Appendix and additional contact details in Appendix 2.

The tobacco dependency advisor will carry out four weekly face to face appointments with the pregnant women/birthing people and six- monthly follow-ups throughout the pregnancy. Records of this will be made on Theseus.

It is advised that all notes to health visitors should include details related to the pregnant woman's/birthing persons stop smoking journey, including their smoking status at time of booking, participation with stop smoking services throughout their pregnancy and their smoking status at time of delivery.

2.6 Prescribing nicotine replacement therapy (NRT)

Unlike smoking, nicotine replacement therapy (NRT) delivers a clean form of nicotine without carbon monoxide to help a pregnant woman/birthing person with her smoking-related withdrawal symptoms and aid her quitting journey.

There are a variety or NRT products available (patches, nasal spray, gum, lozenge, inhalator, microtab and mouth spray) which can be provided free on prescription during pregnancy and via direct supply from stop smoking advisors. Importantly, pregnancy women/birthing people who use two or more nicotine products (combination NRT) are more successfully at quitting

that those who use a single NRT product. It is recommended that pregnant and breastfeeding women who us a 16-hour patch (i.e. remove at night) in combination with a shorter acting product (e.g. gum, lozenge, inhalator or spray) to assist with managing cravings throughout the day and night (Table 3)

Table 3: Different nicotine replacement products available to pregnant and breastfeeding women/birthing people

Smokes:	**More than 10 cigarettes per day**	**Less than 10 cigarettes per day**
Patch	16hr/25mg	16hr/15mg
Plus ONE of the following fast-acting products:		
Mini Lozenge	4mg indicated	1.5mg indicated
Gum	4mg indicated	2mg indicated
Nicotine Quickmist Mouth Spray	1mg indicated	1mg indicated
Nicorette Inhalator	15mg indicated	15mg indicated

Prescribing nicotine replacement therapy to inpatients

NRT should be prescribed to a pregnant woman/birthing person at the earliest opportunity. Midwives and the medical team should prescribe and dispense NRT products from ward stocks to the inpatient following discussion with the woman/birthing person about the products of choice. A record of any prescriptions should be made on nervecentre eMeds. Additional stock of NRT can be found with the Maternity CURE team advisors and the pharmacy. Two NRT formulations (known as combination therapy); a patch and a fast-acting product should be prescribed to counteract cravings. The maternity staff should advise the patient on the administration method of each product and the withdrawal symptoms of not smoking (Table 4 and Table 5, respectively).

Table 4: Dosage and administration information related to NRT.

PRODUCT	**DESCRIPTION**	**DOSAGE INFORMATION**	**ADMINISTRATION**
Long-acting patch	**16-hour 15mg patch**	Use the strength of patch to match the average daily cigarettes smokes; 15mg patch is for those smokers who use less than 10 cigarettes per day. It will take around 30 minutes to take effect. Use for 6-8 weeks	To be applied upon waking on clean, dry, non-tattooed hairless skin to allow the delivery of a steady state of nicotine throughout the day. Ideally placed on hip, trunk or upper arm. Remove patch before bed. Replace daily. Place new patch on different location of the body.

	16-hour 25mg patch	Use the strength of patch to match the average daily cigarettes smoked; 25mg patch is for those smokers who use more than 10 cigarettes per day. Use for 6-8 weeks and then titrate strength down over 2-4 weeks to 25mg patch. Slower titration may be necessary. See BNF. It will take around 30 minutes to take effect	To be applied upon waking on clean, dry, non-tattooed, hairless skin to allow the delivery of a steady state of nicotine throughout the day. Ideally placed on hip, trunk or upper arm. Remove patch before bed. Replace daily. Place new patch in different location of the body.
Fast-acting product	**Nicotine gum**	Dose of nicotine with effects within 10-15 minutes.	Use whenever the urge to smoke occurs, or to prevent cravings in situations where these are likely to occur.
		Maximum one gum/any one time. Maximum 25 pieces of 2mg gum/day. Maximum 15 pieces of 4mg/day.	Place gum in mouth and chew until soft. For best effect, chew and leave on the side of the mouth between cheek and gum for around 10 minutes. Repeat for about 30 minutes.
	Nicotine Lozenges	Dose of nicotine with effects within 10-15 minutes. 1 lozenge every 1-2 hours Max. 15 lozenges/day.	Use whenever the urge to smoke occurs, or to prevent cravings in situations where these are likely to occur. Avoid acidic/caffeinated drinks for up to 15 minutes before use. Do not eat/drink whilst lozenge is in mouth. Place 1 lozenge in mouth and allow to dissolve slowly (around 20-30 minutes. Do not chew or swallow.
	Nicotine Quickmist Mouth Spray 1mg/spray	Low dose nicotine absorbed within 30 seconds. Use a maximum of 2 sprays when cigarettes normally would have been smoked. Up to 4 sprays/hour Most smokers will require 1-2 sprays every 30 minutes to 1 hour. Max 64 sprays/days	Use whenever the urge to smoke occurs, or to prevent cravings in situations where these are likely to occur. To use, push the back button down whilst sliding it up with your thumb until it locks into place. Spray into air before first use. Spray into the side of the cheek or under the tongue. Wait a few seconds before swallowing. Avoid spraying the lips and back of the throat. Do not inhale.

	15mg Nicorette Inhalator	The amount of nicotine from one puff is less than that from a cigarette. 1 puff on a cigarette is about 10 puffs on an inhalator. A 15mg cartridge lasts for approximately 40 mins of intense use. Otherwise, 1 cartridge lasts 1-4 hours. Max. 6 cartridges/day.	To be used when the urge to smoke occurs or to prevent cravings. Put cartridge in tube, lining up the two marks and piercing both ends. Inhale through the mouthpiece and a dose of nicotine is drawn up and absorbed through the lining of the mouth/throat. Wait a few seconds before blowing out.

Table 5: Withdrawal symptoms related to not smoking including the duration and prevalence.

Symptom	Duration	Prevalence
Light headedness	<2 days	80%
Nigh time awakenings	<1 week	10%
Poor concentration	<2 weeks	17%
Irritability/aggression	<4 weeks	50%
Depression	<4 weeks	60%
Restlessness	<4 weeks	40% (8% severe)
Constipation	>2 weeks	70%
Mouth Ulcers	>4 weeks	60%
Increased appetite	>10 weeks	70%

2.7 Stance of E-Cigarettes

Users of electronic cigarettes, are not classified as smokers. However, a referral to local authority stop smoking services should be made to avoid relapse to tobacco products.

The Leicester City Council and Leicestershire and Rutland County Council stop smoking services offer free e-cigarettes for women/birthing people who choose this way of helping them to quit smoking. E-cigarettes are currently not available within UHL premises i.e. inpatients.
However, a pregnant woman/birthing person can choose to take up e-cigarettes upon discharge in her weekly or monthly follow up appointments with stop smoking services.

3. Education and Training

Staff should have received approved training to support smoking cessation. Training is provided by the local stop smoking services and in house stop smoking services in the mandatory midwifery training programme, face to face training sessions and online training sessions. A Detailed description of this training can be found below.

Additional education and training can be found on:

The NCSCT Training Website : NCSCT e-learning
ASH Smoking in Pregnancy Challenge Group: Smoking in Pregnancy Challenge Group – Smokefree Action Coalition
The e-learning for healthcare Training Website: https://www.e-lfh.org.ul/programmes/smoking-in-pregnancy/

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Compliance of CO testing and referral rates	Audit	F Cox/B Cowlishaw	Yearly	Maternity Governance

Data related to this updated smoking in pregnancy guideline will be analysed for effectiveness using Tobacco Patient Level Data submissions to NHS England via NHS Digital.

5. Supporting References

NICE (2021- UPDATED 2023) Guideline on tobacco: preventing uptake, promoting quitting and treating dependence (NG209) https://www.nice.org.uk/guidance/ng209/resources/tobacco-preventing-uptake-promoting-quitting-and-treating-dependence-pdf-66143723132869
NICE (2021) Antenatal care guidelines NG 201
https://www.nice.org.uk/guidance/ng201/resources/antenatal-care-pdf-66143709695941
Antenatal care Guidelines (CG). NICE. London
Department of Health 2015 Health matters: smoking and quitting in England
https://www.gov.uk/government/publications/health-matters-smoking-and-quitting-in-england/smoking-and-quitting-in-england

www.ncsct.co.uk/publicationecigarettebriefing.php

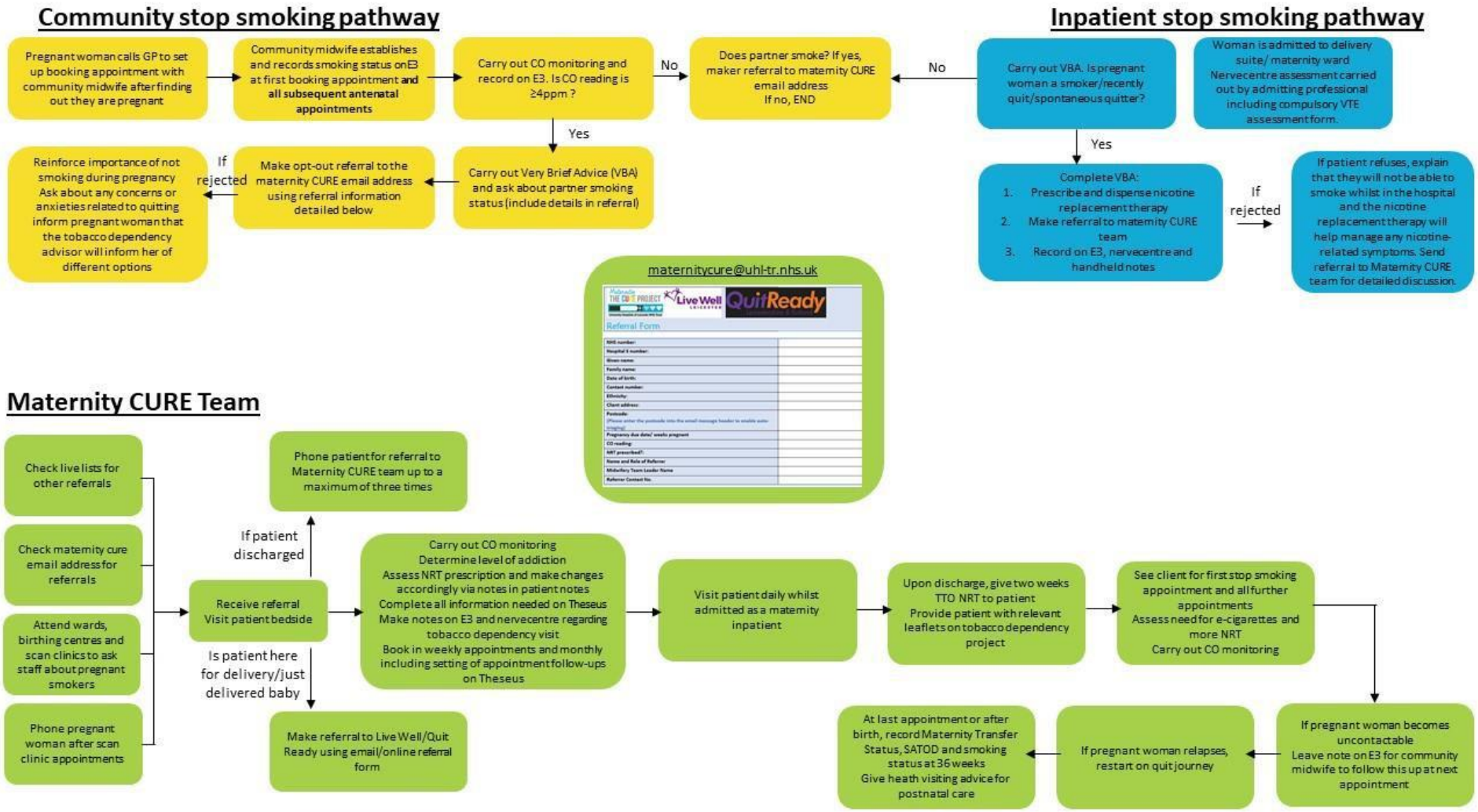
6. Key Words

Co monitoring, E-Cigarettes, Vaping

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

CONTACT AND REVIEW DETAILS			
Guideline Lead (Name and Title) Bev Cowlishaw - Public Health Midwife			**Executive Lead** Chief Nurse
Details of Changes made during review:			
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
September 2023	**5**	B Cowlishaw – PH Midwife A Dattani – Honorary Cure Project Manager Maternity guidelines group Maternity Governance Committee	**Introduction now focuses on smoking and associated risks** **Now includes Very Brief Advice to be offered at every point of contact. Added information on prescribing NRT** **Includes how to use CO monitor guidance.** **Signposts to CURE service**

1.1 Appendix 1: Community stop smoking



Appendix 2: Additional contact information:

CONTACT	CONTACT DETAILS	WEBSITE
In-house Maternity Tobacco Dependency Service	maternitycure@uhl-tr.nhs.uk	Other Pregnancy Information (leicestershospitals.nhs.uk)
UHL Maternity Pharmacist	rosie.meakin@uhl-tr.nhs.uk 07577 009971	Other Pregnancy Information (leicestershospitals.nhs.uk)
Local Authority Stop Smoking Services (City)	Live Well, Leicester City Council Ground Floor rooms 92,93 and 95 Braunstone Health and Social Care Centre, 39 Hockley Farm Road Leicester, LE3 1HN livewell@leicester.gov.uk	Helping to improve Leicester's Health and Wellbeing - Live Well Leicester