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**Title page**

Title: Pregnancy and tobacco: practice and knowledge of French midwives.

Authors : Béatrice Pierrot<sup>a, b, c, d</sup>, Guillaume Legendre<sup>a, b</sup>, Jérémie Riou<sup>e, f</sup>, Alexandra Gentil<sup>c</sup>,  
Brigitte Molle-Guiliani<sup>c</sup>, Audrey Petit<sup>d</sup>

<sup>a</sup> Service de gynécologie-obstétrique, Centre hospitalier universitaire d'Angers, 4 rue Larrey,  
49933 ANGERS cedex 9, France

<sup>b</sup> École de sages-femmes, Centre hospitalier universitaire d'Angers, 4 rue Larrey, 49933  
ANGERS cedex 9, France

<sup>c</sup> Unité de coordination de tabacologie, département de pneumologie, Centre hospitalier  
universitaire d'Angers, 4 rue Larrey, 49933 ANGERS cedex 9, France

<sup>d</sup> Irset, Inserm UMR 1085, équipe Ester, UFR Santé, Département de Médecine, Rue Haute  
de Reculée 49045 Angers Cedex, France

<sup>e</sup> MINT, UMR INSERM 1066, UMR CNRS 6021, UNIV Angers, Micro Et Nano Médecines  
Translationnelles, Angers, France

<sup>f</sup> Methodology and Biostatistics Department, Delegation to Clinical Research and Innovation,  
Angers University Hospital, 49100, Angers, France

Corresponding author: Béatrice Pierrot

Mail: [bepierrot@chu-angers.fr](mailto:bepierrot@chu-angers.fr)

Tel: 0033-2-41-73-59-86

Portable: +33-6-68-50-54-47

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## **Introduction**

According to the WHO, tobacco use is responsible for more than 8 million deaths per year globally. Seven million of these deaths are due to direct use and 1.2 million due to passive smoking (World Health Organisation, 2022). France has taken several measures to reduce tobacco use, including the “Veil” law of 1976, the “Évin” law of 1991, the signing of the WHO International Framework Convention on Tobacco Control in 2003, the 2006 decree banning smoking in public places, the three national cancer plans (2003–2007, 2009–2013 and 2014–2019), the 2014–2019 National Tobacco Use Reduction Programme and, most recently, the 2018–2022 National Tobacco Control Programme (World Health Organisation, 2003; Cancer Plan, 2003–2007; Cancer Plan, 2009–2013; Cancer Plan, 2014–2019; National Tobacco Use Reduction Programme, 2014; National Tobacco Control Programme, 2018–2022). Despite these efforts, in France alone, 75,000 deaths per year are still attributable to smoking (Bonaldi et al., 2019).

Smoking during pregnancy is still very prevalent in many parts of the world (Poissant et al., 2022). Lange's meta-analysis shows a prevalence of smoking during pregnancy of 8.1% in Europe and 5.9% in America. Worldwide, 72.5% of pregnant smokers smoke on a daily basis. Furthermore, in Europe, 30.6% of women who smoke daily continue to do so during pregnancy (Lange et al., 2018). European data published in 2018 indicate that tobacco use among pregnant women in France remains stable while the trend is downward in most other countries (16.3% of women in the 3rd trimester; 20th out of 22 countries with statistics on this topic) (Zeitlin et al., 2018). Tobacco use is the main modifiable risk factor for pregnancy-related morbidity and mortality as it represents a risk factor for premature rupture of membranes, placenta praevia and intrauterine growth restriction (Le Houezec, 2005; Underner et al., 2017). The major meta-analysis by Quelhas published in 2018 confirms the

effects of tobacco on growth retardation and head circumference with a dose-response effect (Quelhas et al., 2018). It is therefore important to screen and manage tobacco use in pregnant women as early as possible.

Two main types of intervention are used to prevent smoking during pregnancy: pharmacological and psychosocial (Poissant et al., 2022). With regard to the latter, Chamberlain's 2017 review of the literature concludes that psychosocial interventions in the form of advice, health education, feedback, incentives, social support and physical exercise can reduce the number of pregnant women who smoke at the end of pregnancy and the number of babies born with a low birth weight (Chamberlain et al., 2022). And, although the evidence remains weak, Claire's meta-analysis concludes that the use of nicotine replacement therapy (NRT) increases the chances of smoking cessation at the end of pregnancy (Claire et al., 2020).

The findings of the latest French perinatal survey in 2016 highlight that while 80% of the women surveyed report having been asked about their tobacco use, only 46.3% of pregnant smokers report being given advice on quitting (Blondel et al., 2017). However, the 2014 recommendations of the French National Authority for Health call for implementing ongoing withdrawal support interventions throughout pregnancy for women (HAS, 2014). The French National College of Obstetricians and Gynaecologists (CNGOF) also recommends the use of self-help and health education interventions to promote stopping smoking during pregnancy (Grangé et al., 2020).

Pregnancy is a favourable time to try to quit smoking thanks to the regular monitoring put in place and the additional motivation associated with the risks posed to the unborn child (Meier, Ndamé, 2022). As part of the team of professionals caring for pregnant women, midwives are key contacts. Worldwide, they account for 10% of sexual, reproductive, maternal, neonatal and adolescent health workers and are key providers of primary health care services (World Health Organisation et al., 2021). The WHO identifies midwives as providers of care to prevent and manage tobacco consumption during pregnancy (World

Health Organisation, 2014). Midwives can encourage pregnant women to stop smoking by using psychosocial and pharmacological interventions. Moreover, in France, midwives have been allowed to prescribe nicotine replacement therapy (NRT) to their patients since a Bill was passed to this effect on 12 October 2005. Since 2016, they have also been allowed to prescribe these NRTs to the child's or pregnant woman's relatives during pregnancy and the postnatal period.

The primary objective of this study was to describe the professional practices and the knowledge of French midwives who were not smoking cessation advisors with regard to treatment for stopping smoking in pregnant women. The secondary objective was to identify the profiles of midwives prescribing and not prescribing NRT.

## Methods

### *Study design*

A national practice survey among 23,541 French midwives was conducted from 1 September 2020 to 15 September 2021 using an online self-administered questionnaire. The study was undertaken in two phases (1 survey sent and 2 reminders for each): firstly, at departmental level in Maine-et-Loire (from September to November 2020); and then at a national level (from February to September 2021).

### *Population studied*

The inclusion criteria for the study were registered midwives who were professionally active at the time of the study, practising in metropolitan France or in a French overseas department and territory, and who had agreed to participate in the study.

The exclusion criterion was a midwife's involvement in professional practices related to stopping smoking.

### *Questionnaire used*

We used data from the literature to create a self-administered questionnaire with 40 questions. The questionnaire was split into five sections:

- Socio-demographic characteristics and smoking status (Q1 to Q5);
- Professional practice characteristics (Q6 to Q10);
- Knowledge of treatment for stopping smoking in pregnant women (Q11 to Q21);
- Practices regarding treatment for stopping smoking in pregnant women (Q22 to Q35);
- Training received on treatment for stopping smoking in pregnant women (Q36 to Q41).

A final question on the need for training on the topics covered in the questionnaire was added to the national stage of the study.

### *Data collection*

We created the self-administered anonymised questionnaire using the Lime Survey® tool.

The URL link to the self-administered questionnaire was shared via email to midwives within

regional departments and then nationally, using the French Departmental Councils of Midwifery database, the French Federation of Perinatal Health Networks and the various French perinatal networks, the coordinating midwives at midwifery schools and to private midwives thanks to the directory of the French National Council of Midwifery.

Questionnaires that were more than 80% incomplete were excluded.

### *Data analysis*

All questionnaire responses collected in both phases of the study and extracted from the Lime Survey® platform were merged in an Excel® table.

Statistical analysis was performed with R software (version 3.5.1, [www.R-project.org](http://www.R-project.org), Vienna, Austria) and Epi Info®. Subjects' characteristics were reported as number and percentage for qualitative variables and as the mean  $\pm$  standard deviation or median [interquartile range (IQR)], as appropriate, for continuous variables. For univariate analysis, data were compared by using chi-squared test for categorical variables and student t-test for continuous variables.

Multivariable logistic regression analysis included all parameters with a p-value  $< 0.1$  in the univariable analysis or parameters judged as clinically relevant. To improve the multivariable models, variable selection was performed using manual step-by-step backward selection with a removal criterion of  $p > 0.1$ . Variance inflation factor (VIF) was computed to check the absence of collinearity against dependent variables. Odds ratios (OR) with 95% confidence intervals (CI) were reported.

Patients with missing data presented no informative data. These data were therefore considered as MCAR (Missing Completely at Random), and no imputation was performed.

### *Ethical considerations*

All data collected were anonymous and no personal data were collected.

As the study involved evaluating professional practices without identifying data, we did not need to request approval from the Ethics Committee.

## Results

Of the 1,411 questionnaires received, 10.8% (n=153) were excluded because these respondent midwives were practising tobacco use consultations and/or were retired. 2.9% (n=42) of questionnaires were incomplete. In total, we analysed 1,216 questionnaires, giving a participation rate nationally of 5.2% (23,541 midwives registered in France, source: DREES, 2021) (Figure 1) (DREES, 2021).

We surveyed every region of metropolitan France and the French overseas departments and territories. The 2 regions with the highest participation rates were Pays de le Loire with 23.6% (n=299/1269) and Centre-Val de Loire with 14.6% (n=118/809). The lowest participation rates were observed in Provence-Alpes-Côte d'Azur (1.9% n= 35/1814) and Île de France (1.6% n=63/3926).

### *General characteristics of the population*

Almost 98% (n= 1188) of the participants in the study were women. The most represented age group was 30–49 years old (59.7% n=725), with most participants having achieved their state diploma in midwifery between 2000 and 2015 (52.7% n=641). The vast majority (82.85% n=991) worked in hospitals (44.35% n=530) or independently (38.5% n=461), and 6.36% (n=75) worked in multiple settings. Lastly, the distribution of midwives providing prenatal care was not even, according to the type of practice. In fact, 60.5% (n=320) of independent midwives performed more than 25% of antenatal monitoring consultations, compared to 52.38% (n=33) of mother and child welfare clinic midwives, 33.33% (n=20) of private or semi-private structure midwives, and 27.77% (n=160) of midwives practising in hospitals (Table 1).

### *Knowledge and training of French midwives*

Fifty-three per cent (n=624) of respondents knew the baseline advice for patients, 91% (n=567) of whom used it. Measurement of exhaled carbon monoxide was performed by 27.1% (n=319) of midwives. The main obstacles to using the CO tester were the lack of



available equipment (75.7% n=603) and unfamiliarity with the equipment (37.4% n= 298). Only 26.9% (n=190) of respondents used the Fagerström test, mainly due to lack of practice (75.7% n= 327), knowledge (33.8% n=146) and time (27.1% n=117) (Table 2).

Forty-three per cent (n=482) of midwives had received initial training without further training in smoking cessation for pregnant women, while 11% (n=123) had received further training without initial training and 7% (n=79) had received both types of training. In contrast, 39% (n=437) of participants had not received any training on tobacco use. Of the midwives surveyed, 72.5% (n=772) said they needed information on nicotine replacement products in general, 82.6% (n=880) needed information on how to prescribe them and 18.3% (n=195) needed information on the effects of smoking during pregnancy (Table 2).

### *The professional practices of French midwives*

The mean score for motivation to help stop tobacco use in pregnant women was  $6.7 \pm 2.1/10$  (n=1143) with routine (74.9% n= 858) or frequent (18.5% n=212) questioning about smoking during pregnancy. NRTs were prescribed routinely by 60% (n=688) of midwives, most often in the form of patches (96.5% n= 664), chewing gum (69.0% n=475) or lozenges (42.0% n= 289). However, only 45.7% (n=523) of facilities had NRT and 38.6% (n=202) of midwives administered them regularly. Eighty-seven per cent (n=996) of the responding midwives did not use any educational materials. This was mainly due to a lack of familiarity with the resources (84.1% n= 838) and/or a lack of time to use them (16.8% n= 167). Lastly, midwives reported referring to a specialist for treatment for stopping smoking in nearly 80% of cases, mainly to a smoking cessation advisor (78.8% n=903), a smoking cessation clinic (22.4% n= 257) or to non-medical treatments such as acupuncture (39.1% n= 448) or hypnosis (28.4% n= 325) (Table 3).

### *Profile of French midwives prescribing and not prescribing NRT*

We found that midwives prescribing NRT significantly frequently worked in hospitals ( $p < 0.001$ ) compared to other settings and carried out 25% or more of antenatal monitoring

consultations ( $p < 0.001$ ). We observed no difference in this respect between sexes, age, year of graduation and smoking status. Midwives prescribing NRT were significantly more familiar with baseline patient advice ( $p < 0.001$ ), the Fagerström test ( $p < 0.00001$ ) and carbon monoxide testing ( $p < 0.001$ ). They were significantly more concerned with stopping smoking during pregnancy ( $p < 0.0001$ ) and had received initial training ( $p < 0.001$ ) and/or postgraduate training ( $p < 0.00001$ ) on tobacco addiction. Midwives not prescribing NRT significantly frequently worked in private and semi-private contexts ( $p < 0.00001$ ) compared to other settings and performed less than 25 % of antenatal monitoring consultations ( $p < 0.001$ ) (Tables 4 and 5).

## Discussion

### Main results

This large sample study shows that the knowledge levels and practices of French midwives regarding stopping smoking in pregnant women are still mixed. In fact, only half of the midwives surveyed were aware of the baseline advice and although the vast majority were aware of the benefits of the Fagerström test and the measurement of exhaled CO, the use of these tests was still very low and the use of educational material was even lower. Furthermore, 80% of midwives expressed a need for training on prescribing NRT, only one third were aware of the possibility of prescribing it to the pregnant woman's relatives and less than two thirds prescribed it routinely. Finally, our study revealed that midwives who prescribe NRT more frequently work in hospitals, as compared to other settings, and provide more than 25% of antenatal monitoring consultations; sex, age, graduation year or smoking status had no influence on this finding.

### Strengths and limitations of the study

The number of participants is one of the strengths of our study. In addition, it represents all the departments of metropolitan France and French overseas departments and territories. To our knowledge, this is also the largest practice survey ever conducted among midwives who were not smoking cessation advisors. Another strength of this study is the relevance of the subject. Indeed, the management of smoking cessation in pregnant women by a primary care professional (in this case the midwife) is highly topical, given the global indicators. An additional advantage is the diversity of the data available, with the originality of identifying a profile of NRT's prescribers. This was the subject of a multivariate analysis. However, the low participation rate is one of the main limitations of our study. Despite more than 1,400 responses, only 5.2% of midwives who were not smoking cessation advisors practising in France responded. Secondly, the application of exclusion criteria to our sample leads to a selection bias. Excluding tobacco-using midwives influenced the results observed. In

addition, the reporting bias inherent in the study design (practice survey) may restrict the ability to generalise our results.

### *Practices and knowledge of French midwives*

The baseline advice is part of the overall advice specified by the CNGOF recommended for all pregnant smokers in order to help them stop (Peyronnet et al., 2020). This advice corresponds to the 2 1st "A"s of the 5As approach to intervention (Ask, advise, assess, assist, arrange) recommended in the United States, Australia and the United Kingdom (HAS, 2014). In fact, this approach is considered one of the best practices to help pregnant women to quit smoking (Longman et al., 2018). Our results show that only half of the midwives in our survey were aware of the baseline advice. While it remains low, the rate observed in our study is higher than those described in 2006 by Decroisette (34.4% among gynaecologists and 26.5% among midwives) (Decroisette, 2006). However, according to Bryce et al., "*not talking about smoking is a major barrier to counselling and engagement for pregnant smokers*" (Bryce et al., 2009).

Furthermore, over half of the midwives (60%) in our study were aware of the 5As approach and only 16% used it. Our results are encouraging when compared to those of a study conducted in Belgium in 2009 which revealed that 73% of midwives were not aware of the Fagerström test (Van Ceulen et al., 2009). Only 28% of the midwives surveyed in our study were actually using the CO tester. The limited role of the CO test in the practice of the midwives surveyed is consistent with the results of the Belgian study in which 73% were not aware of this test and 70% did not know that this measure was relevant in pregnant women (Van Ceulen et al., 2009). However, assessing physical dependence (corresponding to the 3rd "A" in the 5A approach) using the Fagerström test, and measuring CO is an important step in the effective treatment of tobacco use (HAS, 2014). This non-invasive procedure, which quantifies and estimates the CO level to which the unborn child is exposed is also useful for establishing dialogue and facilitating the therapeutic alliance necessary for the

management of pregnant smokers (Decroisette, 2006; Hopman et al., 2019). This assessment is essential, as it used to guide the treatment strategy (Dutoyat, 2018).

This lack of knowledge and practice is also reflected in our study by a lack of use of tools to address smoking during pregnancy by French midwives (87% non-use). Patients also confirmed the underuse of smoking cessation support resources, as 53% of women reported not having received any information on the benefits of smoking cessation and 77% reported not having received an information brochure (Grangé et al., 2006). Furthermore, another study revealed that smoking cessation support was never offered by 62% of gynaecologists and 79% of midwives (Decroisette, 2006). Explaining the risks of smoking to the mother's health and that of her child, the benefits of quitting at any time during the pregnancy and setting a quit date are all tools that can help toward the cessation of smoking (Lumley et al., 2009). The messages must be clear, without creating guilt or hostility (Bryce et al., 2009).

It is therefore important to develop the knowledge and skills of professionals who work with pregnant women (including midwives), in order to detect and manage tobacco consumption as early as possible during pregnancy. Bryce et al. also recommend the introduction of a smoking cessation during pregnancy programme for healthcare professionals (Bryce et al., 2009), which "*would include training, advice and protocols for the provision of information, consistent advice and support to pregnant women*". Such a programme does not exist in France, but could be offered to French midwives by specialist tobacco units.

#### *Barriers to smoking cessation treatment*

In this study, a lack of knowledge about ways to stop smoking (47%) as well as a lack of educational materials (41%) are highlighted as barriers to smoking cessation treatment. The same results were found in a study conducted in New South Wales, where a lack of knowledge was identified as one of the main barriers to weaning would-be mothers off smoking (Longman et al., 2018). In addition, almost all French midwives were aware of the right to prescribe NRT. Although this right to prescribe has existed in France since 2016, only

a third of midwives surveyed were aware that they could prescribe NRT to members of the pregnant woman's support network during pregnancy or the child's support network during the postnatal period. Finally, the main obstacle identified by French midwives (65%) in treatment for stopping pregnant women smoking is the patient's lack of motivation. This finding is consistent with a similar study conducted in the Netherlands in 2016, which revealed that 61% of Dutch midwives highlighted this lack of motivation and pointed out that the most motivated women quit smoking at the start of the pregnancy (Hopman et al., 2019). It is therefore important to give the appropriate care and attention to motivating pregnant smokers. This is why motivational meetings recommended by the CNGOF should become routine practice for teams treating pregnant smokers and be included in the smoking cessation programme for healthcare professionals (Peyronnet et al., 2020; Diamanti et al., 2019).

#### *Profiles of midwives prescribing or not prescribing NRT*

The CNGOF recommends that all professionals commence NRT in early pregnancy in all pregnant smokers who have unsuccessfully tried to stop smoking without NRT (Grangé et al., 2020). Furthermore, women should be informed that using prescribed NRT is less harmful than continuing to smoke during pregnancy (HAS, 2014). Just over half of the midwives in our study report prescribing NRT. A study conducted in Normandy found that a lower proportion of midwives (44%) used NRT (Laenen, 2018). Generally speaking, French midwives do not prescribe NRT. However, a pregnant smoker is likely to be more dependent on nicotine than a non-pregnant woman, and therefore requires the use of NRT at an effective dose (Laenen, 2018).

In our study, Midwives who do not prescribe NRT carry out less than 25% of antenatal monitoring consultations, work mainly in private practice, have limited knowledge of smoking cessation and have not received any initial and/or postgraduate training. There are two possible reasons for the lower levels of midwives prescribing NRT in private practice. Firstly, more than half of them (52%) have never provided antenatal monitoring consultations.

Secondly, according to Carayol, French midwives practising in hospital call upon all of their skills more often, unlike midwives practising in private settings, who tend to act on a doctor's orders (Carayol, 2004).

The lack of training in smoking cessation for pregnant women supports our proposal to set up a training programme. Such a training programme, initially targeted at midwives working outside hospitals, would cover the various elements of minimum advice, CO measurement in exhaled air, the assessment of physical dependence using the Fagerström test, explanation of the various tools available to help smoking cessation, and a guide to prescribing NRT. It would be interesting to offer simulation sessions as part of these training courses, in order to lend weight to the difficulties encountered in practice linked to patients' lack of motivation as well as the difficulties faced by professionals when broaching this subject with their patients.

**Conclusion**

French midwives have limited knowledge and only briefly cover smoking cessation in their care for pregnant women who smoke. This could be linked to a lack of awareness and/or lack of training in the recommendations for effective treatment of smoking during pregnancy. However, midwives are primary care professionals and have a key role in supporting women and couples during pregnancy. They should be able to provide the essential screening step and then provide appropriate information to motivate, assess, assist and then refer patients where necessary.

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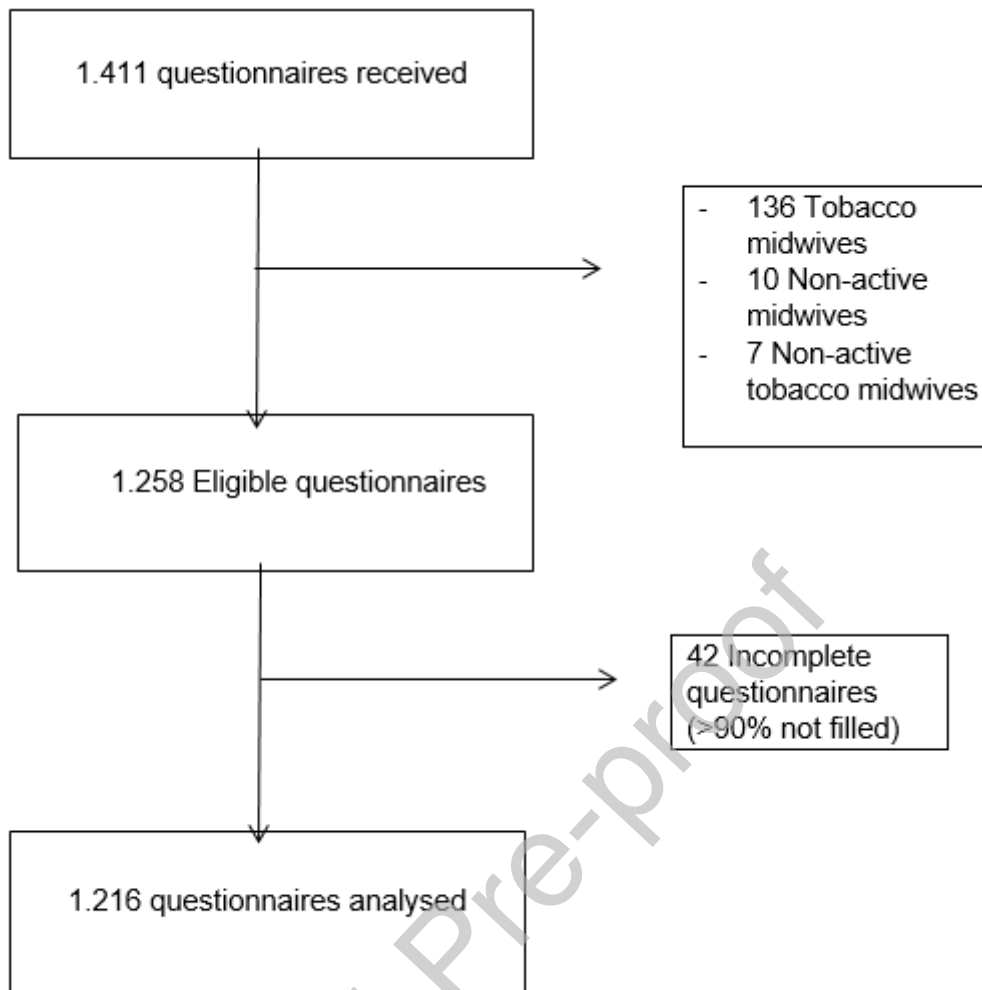


Figure 1. Flow chart of the study.

Table 1. Characteristics of the population studied.

	N	%
<b>Gender</b>	<b>1215</b>	
Women	1188	97.78
Men	27	2.22
<b>Age (years)</b>	<b>1214</b>	
18 - 29	244	20.08
30 - 39	432	35.56
40 - 49	293	24.12
50 - 59	210	17.28
60 and over	35	2.96
<b>Graduation year</b>	<b>1216</b>	
Before 1990	150	12.33
1991 to 1999	217	17.84
2000 to 2009	358	29.44
2010 to 2015	283	23.27
After 2015	208	17.10
<b>Tobacco status</b>	<b>1215</b>	
Smoker	111	9.14

Non-smoker	871	71.69
Ex-smoker	228	18.77
Do not wish to answer	5	0.40
<b>Type of practice *</b>	<b>1195</b>	
Hospital	576	48.20
Independently	529	44.26
Private /semi private structure	81	6.77
Mother and child welfare clinic	67	5.60
Other	22	1.84
<b>Practice of antenatal monitoring consultations</b>	<b>1194</b>	
Never	304	25.46
<25 % of the activity	394	32.99
25 à 50 % of the activity	363	30.41
>50 % of the activity	133	11.14

\*Multiple answers possible

Table 2. Knowledge and training of French midwives regarding stopping smoking in pregnant women

	N	%
<b>Baseline advice for patients</b>	<b>1176</b>	
Known	624	53.06
Known and used (n=623)	567	91.01
Not known	327	27.81
Do not know	225	19.13
<b>The Fagerström test</b>	<b>1176</b>	
Known	706	60.03
Not known	432	36.73
Known and used (n=706)	190	26.91
Do not know	38	3.23
<b>Measurement of exhaled carbon monoxide</b>	<b>1176</b>	
Known	1115	94.81
Known and used (n=1115)	319	27.13
Known and used and know how to interpret it (n=317)	239	75.39
<b>Law to prescribe NRTs<sup>1</sup> by midwives</b>	<b>1176</b>	
Known	1144	97.28
Not known	32	2.72
<b>Populations to which the midwife can prescribe NRTs<sup>1*</sup></b>	<b>1144</b>	
Pregnant women	790	69.06
All the women	528	46.15
Partner of the pregnant women	547	47.81
Pregnant women circle (including men)	421	36.80
Circle of all women	91	7.95
Others	5	0.43
<b>Training received regarding tobacco addiction</b>	<b>1121</b>	
Initial training	561	50.04
Further training	200	17.84
<b>Sufficiently trained to take care of smoker patients</b>	<b>1121</b>	

Not at all /little	918	81.89
Good /three good	203	18.11
<b>Wish for a short training</b>	<b>1119</b>	
Yes	877	78.37
No	242	21.63

\*Multiple answers possible

<sup>1</sup>NRTs: Nicotine Replacement Therapies

Table 3. The professional practices of French midwives with regard to treatment for stopping smoking in pregnant women.

	N	%
<b>Involved in the care</b>	<b>1146</b>	
A lot	281	24.52
Enough	462	40.31
Moderately	303	26.44
Little	100	8.73
<b>Questioning tobacco use during pregnancy</b>	<b>1146</b>	
Always	858	74.87
Often	212	18.50
Rarely	71	6.20
Never	5	0.44
<b>Practice to prescribe NRTs<sup>1</sup></b>	<b>1146</b>	
Yes	688	60.03
No	458	39.97
<b>Mean reason do not prescribe NRTs<sup>1</sup>*</b>	<b>458</b>	
Unfamiliarity with dosages	321	70.09
Referring to a specialist	272	59.39
Unfamiliarity with NRT possible	198	43.23
Not desired by the patient	49	10.23
<b>Types of NRTs<sup>1</sup> prescribed*</b>	<b>688</b>	
Patches	664	96.51
Chewing gum	475	69.04
Lozenges	289	42.01
Sublingual tablets	157	22.82
Inhaler	63	9.16
Others	12	1.74
<b>NRTs<sup>1</sup> available in the structure</b>	<b>1145</b>	
Yes	523	45.68
No	460	40.17
Do not know	162	14.15
<b>Administration of NRT<sup>1</sup> if available in the structure</b>	<b>523</b>	
Always	11	2.10
Often	191	36.52
Rarely	260	49.71
Never	61	11.66
<b>Patient referral*</b>	<b>1146</b>	
A smoking cessation advisor	903	78.80
Acupuncturist	448	39.09
Hypnotherapist	325	28.36
A smoking cessation clinic	257	22.42
Attending physician	133	11.61
Psychologist	76	6.63
Tobacco midwife	64	5.58

Pneumologist	5	0.44
Other	38	3.31
No	28	2.44
<b>Barriers to ownership*</b>	<b>1146</b>	
The patient's lack of motivation	753	65.71
Lack of knowledge about ways to stop smoking	539	47.03
Lack of educational materials	481	41.97
Lack of time	338	29.49
Lack of contact with a doctor/tobacco specialist	172	15.01
Lack of motivation	101	8.81
Other	46	4.01
No	28	2.44

\*Multiple answers possible

<sup>1</sup>NRTs: Nicotine Replacement Therapies

	Midwives not prescribing of NRTs*		Midwives prescribing of NRTs*		p.value <sup>c</sup>
	N	%	N	%	
<b>Gender</b>	458		688		1.000
Man	10	2.18	14	2.03	
Woman	448	97.82	674	97.97	
<b>Age</b>	458		688		0.019
18 – 29 years	96	20.96	133	19.33	
30 – 39 years	138	30.13	272	39.53	
40 – 49 years	120	26.20	154	22.38	
50 – 59 years	85	18.55	113	16.42	
60 years and over	19	4.16	16	2.34	
<b>Year of graduation</b>	458		688		0,29
1990 - 2015	374	81.66	578	84.01	
After 2015	84	13.34	110	15.99	
<b>Tobacco status</b>	456		687		0,61
Smoker	37	8.11	67	9.75	
Non-Smoker	333	73.03	495	72.05	
Ex- smoker	86	18.86	125	18.20	
<b>Independently practice</b>	458		688		0,446
Yes	211	46,07	300	43,60	
No	247	53,93	388	56,40	
<b>Mother and child welfare clinic practice</b>	458		688		0,196
Yes	31	6,77	33	4,80	
No	427	93,23	655	95,20	
<b>Private/semi private structure practice</b>	458		688		0,001
Yes	44	9,6	32	4,65	
No	414	90,39	656	95,35	
<b>Hospital practice</b>	458		688		<0,001
Yes	189	41,27	364	52,91	
No	269	58,73	324	47,09	
<b>Practice of antenatal monitoring consultations</b>	458		688		<0,001
Never	132	28.82	157	22.82	



<25 % of the activity	165	36.02	213	30.96
25 à 50 % of the activity	116	25.33	234	34.01
>50 % of the activity	45	9.83	84	12.21
<b>Knowledge of Baseline advice for patients</b>	458		688	<0,001
Yes	184	40.17	422	61.34
No	164	35.81	153	22.24
Inadequate knowledge	110	24.02	113	16.42
<b>Knowledge of the Fagerström test</b>	458		688	<0,001
Yes	190	41.48	496	72.09
No	254	55.46	168	24.42
Inadequate knowledge	14	3.06	24	3.49
<b>Knowledge of the Measurement of exhaled carbon monoxide</b>	458		688	<0,001
Yes	418	91.27	669	97.24
No	40	8.73	19	2.76
<b>Concerned about tobacco management in pregnancy</b>	458		688	<0,001
A lot	80	17.47	201	29.21
Enough	161	35.15	301	43.75
Moderately	148	32.31	155	22.53
Little	69	15.07	31	4.51
<b>Questioning tobacco use during pregnancy</b>	458		688	<0,001
Always	320	69.87	538	78.20
Often	90	19.65	122	17.73
Rarely/Never	48	10.48	28	4.07
<b>Initial training on tobacco addiction</b>	449		672	0,001
Yes	199	44.32	361	53.72
No	250	55.68	311	46.28
<b>Postgraduate training on tobacco addiction</b>	449		672	<0,001
Yes	40	8.91	160	23.81
No	409	91.09	512	76.19
<b>Desire for a short course on tobacco addiction</b>	447		672	0,226
Yes	359	80.31	518	77.08
No	88	19.69	154	22.92

\*NRTs: Nicotine Replacement Therapies

<sup>c</sup> chi-squared test

Table 5. Factors favouring prescribing and non-prescribing of NRT's\* by midwives in pregnant women

Type of practice	OR	[IC 95%]	p-value
Hospital	1	/	/
Independently	0.6480712	[0.47651106, 0.8794372]	<0.001
Private/semi-private structure	0.2215944	[0.10913067, 0.4317495]	<0.00001
Mother and child welfare clinic	0.3166639	[0.1711078, 0.5833177]	<0.0001

Other	0.1653504	[0.02231842, 0.8579692]	0,04
<b>Practice of antenatal monitoring consultations</b>			
< 25% of the activity	1	/	/
≥25 % of the activity	1.6221922	[1.2003671, 2.1989512]	<0.001
<b>Knowledge of Baseline advice for patients</b>			
No	1	/	/
Yes	1.6124608	[1.16926919, 2.2225824]	<0.001
Inadequate Knowledge	1.0566582	[0.71901080, 1.5530212]	0.78
<b>Knowledge of the Fagerström test</b>			
No	1	/	/
Yes	2.8240333	[2.12960681, 3.7526334 ]	<0.00001
Inadequate Knowledge	2.3216299	[1.11422753, 4.9851710]	0.02
<b>Knowledge of the Measurement of exhaled carbon monoxide</b>			
No	1	/	/
Yes	2.2084892	[1.18937751, 4.2191379]	<0.001
<b>Initial training on tobacco addiction</b>			
No	1	/	/
Yes	1.4339214	[1.09294748, 1.8833024]	<0.001
<b>Postgraduate training on tobacco addiction</b>			
No	1	/	/
Yes	2.3419250	[1.55310128, 3.5989363]	<0.00001
<b>Concerned about tobacco management in pregnancy</b>			
Little	1	/	/
A lot	2.6314157	[1.51980056, 4.6136081]	<0.0001
Enough	2.6610642	[1.60845277, 4.4669579]	<0.0001
Moderately	1.9374177	[1.15791925, 3.2892916]	<0.01

\*NRTs: Nicotine Replacement Therapies

Credit Author Statement

We declare that the study was not supported by found

**Conflict of interest**

The authors declare no conflict of interest regarding this study.

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