GUYS AND ST THOMAS

STOP SMOKING SERVICE

Report on CO monitoring at Kings College Hospital at booking and 36 weeks

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Introduction

The adverse consequences of maternal smoking during pregnancy carry a significant human and financial cost. Approximately 2,200 premature deliveries, 5000 miscarriages, 300 perinatal deaths per annum in the UK are attributable to maternal smoking during pregnancy.[1] The annual estimated cost to the NHS of treating mothers and babies with problems caused by smoking in pregnancy is £87.5 million.[2]

Three years following publication, King's maternity services had *one outstanding key recommendation* from NICE Public Health guidance, 'Quitting Smoking in pregnancy and following childbirth' - Routine offer CO monitoring to all pregnant women at booking. (Reference NICE 2010). Midwives are well placed to identify and refer pregnant smokers to Specialist Stop Smoking Services. A history of smoking status is integral to initial assessment completed by midwives with an established referral pathway to Specialist Stop Smoking Services.

Reliance on self-reported smoking status results in gross under-estimation of the number of women smoking at time of booking, as well as at time of delivery, possibly denying more than 2000 pregnant smokers the opportunity to utilise appropriate counselling interventions.[3]

Biochemical validation provides a more accurate record of smoking prevalence during pregnancy and can increase the number of referrals to Specialist Services. In October 2013 The Southwark Pregnancy Stop Smoking Service designed and delivered a training programme to equip King's midwifery staff to:

- Administer Carbon Monoxide breath test at time of Booking
- and at thirty six weeks
- Interpret the results
- Increase confidence in raising the issue of smoking
- Refer to local Stop Smoking Services

Project Timeline

July 2012	Discussions occurred & tacit agreement to biochemical testing
30th May 2013	Funding is made available from Kings Midwifery Department
31st May 2013	Costs for equipment obtained
16th July 2013	First planning Meeting
31st October 2013	First training delivered

Design and Delivery

The Southwark Pregnancy Specialist Stop Smoking Service was set up in 2000, it is a long established Community based Service that offers intensive support to pregnant smokers beyond point of delivery. It has worked collaboratively with Kings Midwifery Department since its conception.

Southwark provides a specialist and intensive ante and postnatal service; it is a community based service, for pregnant women and parents of young children. Our remit extends beyond pregnant smokers and includes parents /carers and extended family members of young children. In addition to this, we train Health Care Professionals to deliver an intermediate Smoking Cessation intervention.

Kings Substance Misuse Midwife, Ann Sayers, was trained in Southwark as a Stop Smoking Advisor. She played a key role in the collaborative working between Kings College Midwifery Service and the Southwark Specialist Service.

In the summer of 2012, post publication of NICE Guidance, we were invited by Teresa Arias; the Consultant Midwife, to present to the Kings midwives on Smoking Cessation during pregnancy - learning from evidence and practice. The main barrier to implementing NICE Guidance was funding. One year later, £2,500 was made available for delivery of the project.

Costs and Equipment

- Total Budget: £2500 agreed in May 2013. Choice of CO monitors was dictated by cost implications. It was agreed to use the Bedfont baby monitor. Adequate funding was found to provide one monitor per team, the bare minimum required to run the project.
- Bedfont piCO Smokelysers x 14 @ £119 per unit = £1666

- Loan of 2 CO monitors from Public Health = 16 monitors
- Mouthpieces 250 per box @ £10
- Projected bookings = 6400 screenings based on previous years bookings since 2010 = £256
- Box of 12 D pieces @ £19.50 16 boxes needed for the year = £312
- Total cost for 1 year = £2,234
- Two monitors loaned from Public Health.
- Public Health provided funding for laminated CO Charts.
- After implementation a further 3 monitors were purchased = £357

Data Recording

We drafted an additional paragraph to be included in the booking appointment letter, introducing the CO test and the rationale for its administration. This allowed the breath test to be perceived as part of the routine antenatal care, much like any other test, thus normalising the process.

'Your appointment may last up to two hours and offers the opportunity to: Discuss and consider recommended screening tests including Carbon Monoxide monitoring. Carbon Monoxide in the blood stream usually occurs when you are exposed to tobacco smoke or faulty gas appliances.'

Women are currently booked in the first trimester when possible, ideally at around 10 weeks gestation. During the booking interview there are several questions asked in relation to the woman's smoking history. She is asked if she ever smoked and following this the CO reading is imputed. If the reading is not taken it is recorded as not taken. She is also asked if she was smoking before she became pregnant and if she is currently smoking. She is then asked how many she is smoking a day and if she would like a referral to smoking cessation services. She is then asked if anyone in her household has smoked within the last two weeks. Following delivery, the midwives are asked if a 36 week CO reading was taken and this is entered in parts per million (ppm), again it is recorded as not taken if this is the case. The next question is whether she is currently smoking; the options being yes, no or has never smoked.

Training

In order to make the best use of our time we offered two sessions per day, morning and afternoon on Tuesdays, Thursdays or Fridays promoting greater flexibility and choice for the midwives. Each session was two and a half hours long and included a mix of didactic and experiential learning. Prior to training delivery, we anticipated resistance from the midwives; therefore specific exercises were designed to address reservations concerning administering the CO breath test and challenging myths and misconceptions. The degree of resistance encountered during the initial training sessions was high because of negative perceptions of CO testing, however, the majority of their fears were dispelled as they engaged in the session and began to understand the rationale behind the test and the speed with which the test can be administered. The training emphasised that the CO test was not a policing tool, but offered pregnant women the opportunity to make informed choices and increased accessibility into Specialist Services, choice underpins midwifery practice.

As part of the practical training we composed an easy script for the midwives to use, in order to explain the rationale behind the test, interpret the test and make a referral, when appropriate. We gave great consideration to the language used, ensuring that it reflected a non-judgemental attitude and engaged the pregnant woman without impinging on the relationship. Furthermore, the choice of language enabled the midwives to have a more meaningful conversation when raising the issue of smoking with the pregnant woman. We felt it was important to introduce the idea of CO monitoring as a therapeutic tool as opposed to a punitive measure, offering women choices and the opportunity for greater maternal attachment, as well as an automatic referral to the Specialist Stop Smoking Service.

Topics included in the training session were:

- Evidence of unreliability of self reporting
- Evidence of risks of maternal smoking
- The NICE Guidance
- Therapeutic value of the test
- The nature of nicotine addiction
- Referral pathway
- Promotion of complete cessation rather than cutting down
- A post training evaluation form was devised to measure key learning objectives:
- Perceived skills in administering the CO test
- Skills to discuss and interpret the test
- Confidence in raising the issue of smoking
- Awareness of harm to the unborn child
- Awareness of the referral pathway into Specialist Services

Resources

Midwives were given a number of resources to support their administration of the CO breath test including:

- Smokerlzyer Maternity CO Chart with printed Summary of Actions on reverse
- Smokefree Healthy Bump, Healthy Baby Start for Life pack containing resources to encourage parents-to-be and their networks to quit smoking

Training Outcomes

Midwives commenced CO testing on 10/02/14. The first week saw a 100% increase in identification of pregnant smokers and their referral to Specialist Stop Smoking Services, compared to an average week during the previous three months that relied on self-reported smoking status.

Most of the Midwives reported that they were not aware of the full extent of risks connected to maternal smoking during pregnancy, nor did they understand the mechanism of nicotine addiction or that smoke related harm to the baby is not dose related and that cutting down does not minimise the risk for the baby. There was surprise that even one cigarette can potentially cause up to fifteen minutes of foetal distress. [4]

A number of midwives were unaware that the referral to the Specialist Stop Smoking Service is opt-out rather than an opt-in.

Training Evaluation

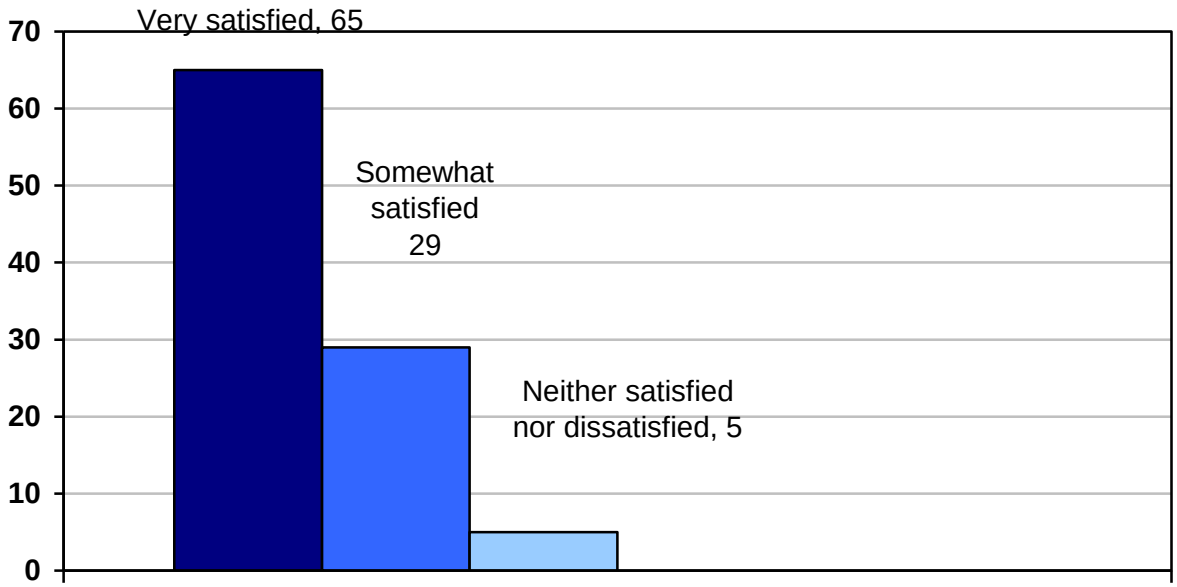
The training was well received: 93% of attendees reported greater confidence in raising the issue of smoking in the post training evaluation questionnaire.

A five question questionnaire was designed to be completed at the end of each training session. Each question was measured on a five point value scale ranging from Very Satisfied to Very Unsatisfied. Further comments or suggestions were welcomed. 99 questionnaires were returned.

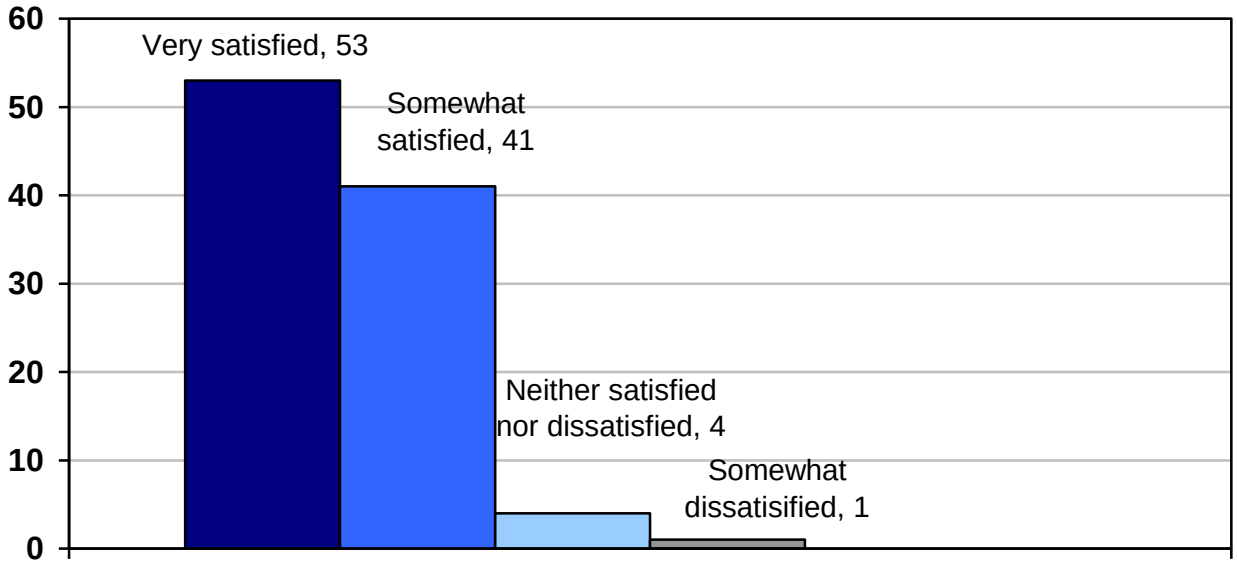
Midwife CO Monitoring Training at Booking Evaluation

The total number of answered evaluation forms is 99.

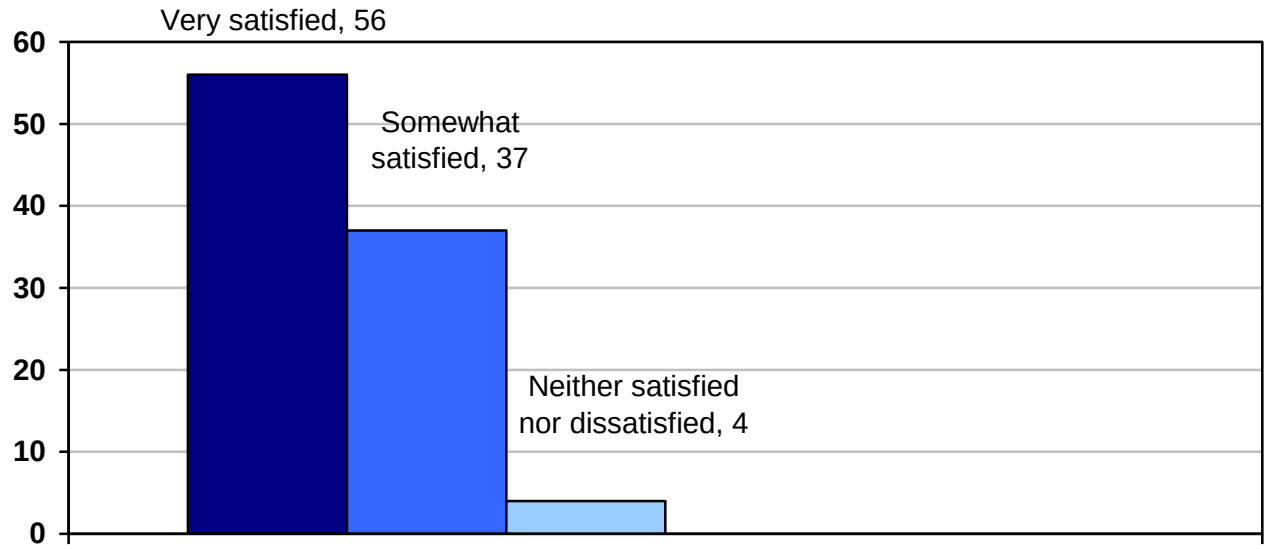
1/ How satisfied are you that the training has equipped you with the necessary skills to administer the CO breath test to pregnant women and record the result?



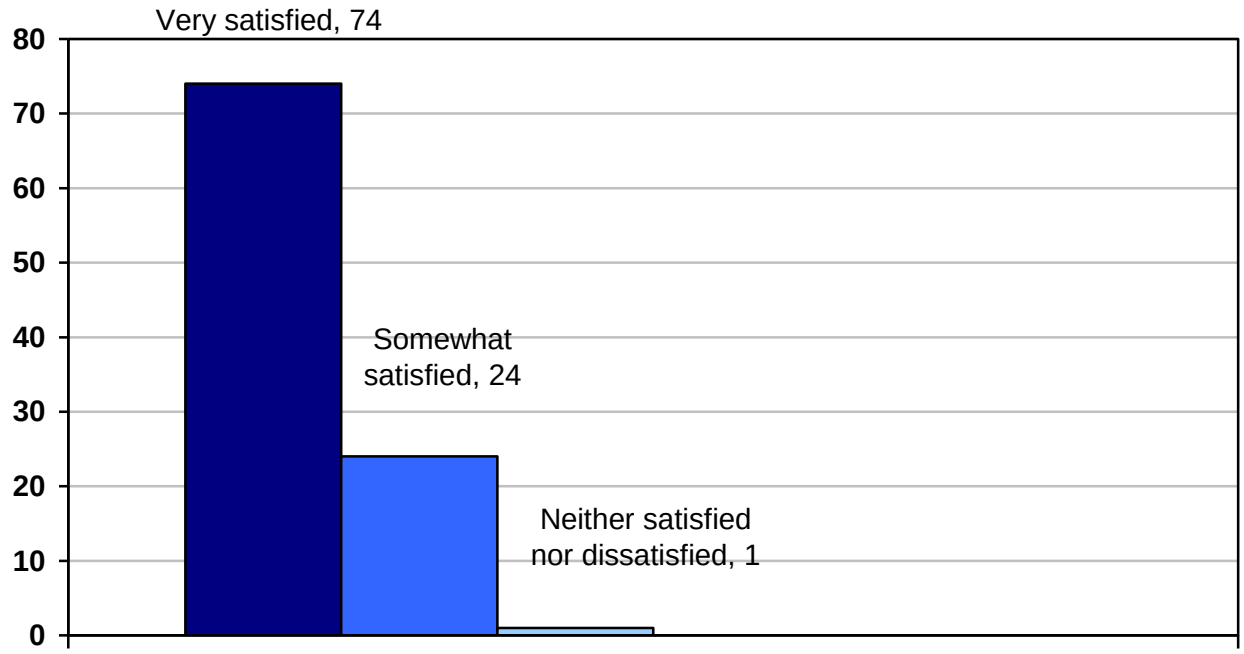
2/ How satisfied are you that the training has equipped you with the necessary skills to discuss and interpret CO breath test result with pregnant women?



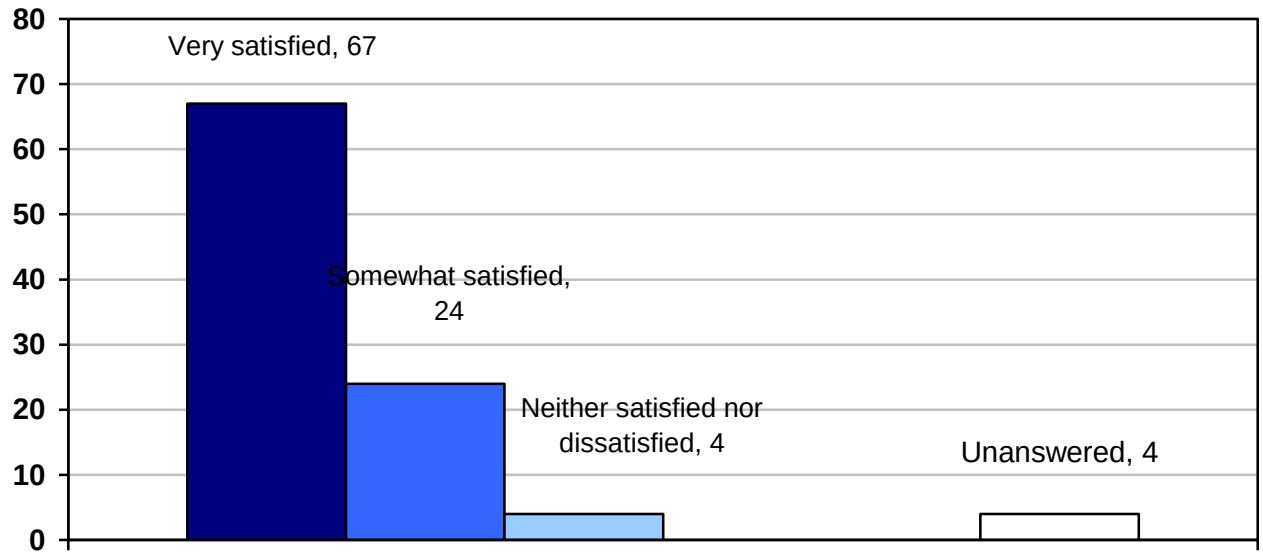
3/ How satisfied are you that the training has increased your confidence in raising the issue of smoking with pregnant women?



4/ How satisfied are you that the training has raised your awareness of harm to the unborn child from exposure to tobacco smoke?



5/ How satisfied are you that the training has raised your awareness of referral pathway to the pregnancy stop smoking service?



Implementation of the CO test post training

Initially it was intended that the CO testing would begin at booking in January 2014, however, this proved to be an unrealistic ambition. The start date was moved to April, resulting in an extended time lag between training and CO test implementation.

The midwives' perceived anxieties in relation to administering the breathe test, such as: non compliance on part of the pregnant women; time constraints and the perceived impingement on the relationship were not realised. On the contrary, the test was accepted and welcomed by the women; additionally partners also expressed a desire to be tested alongside the pregnant woman on many occasions. None of the women have declined the CO test so far.

Unanticipated Outcomes

The biggest unforeseen obstacle to implementation was an environmental impact on the accuracy of the readings, particular to the Midwives House, where there were an unusually high number of false positive readings. A member of the Midwifery team had tested herself, registered an elevated reading of 7ppm and as a result found she had a faulty boiler and Carbon Monoxide leak in her home. This led to the Midwives working from the Midwifery House being extra cautious when interpreting elevated

readings, losing sight of the multitude of reasons for why there may be a false positive. This was exacerbated by the time lag from training to final implementation.

An additional factor may have been that midwives do not in general use equipment that is easily influenced by external/environmental factors.

The project was placed on hold for three months; from July and September 2014, resuming in October 2014.

Numbers trained

150 midwives have been trained to date.

Data Outcomes

CO Monitoring at Booking April 2014 – March 2015

2330 of women were CO tested at Booking in 2014-15 (37%).

KCH Denmark Hill CO Monitoring at Booking - April 2014 to March 2015

Bookings	CO Reading				
	CO Reading Taken		CO Reading Taken Total	CO Reading Not Taken	Grand Total
Month	Under 4ppm	4+ ppm			
Apr-14	44	14	58	490	548
May-14	136	90	226	332	558
Jun-14	190	142	332	155	487
Jul-14	16	2	18	529	547
Aug-14				463	463
Sep-14	21	5	26	529	555
Oct-14	85	62	147	389	536
Nov-14	285	127	412	166	578
Dec-14	172	73	245	226	471
Jan-15	180	111	291	262	553
Feb-15	172	94	266	245	511
Mar-15	188	121	309	213	522
Grand Total	**1489**	**841**	**2330**	**3999**	**6329**

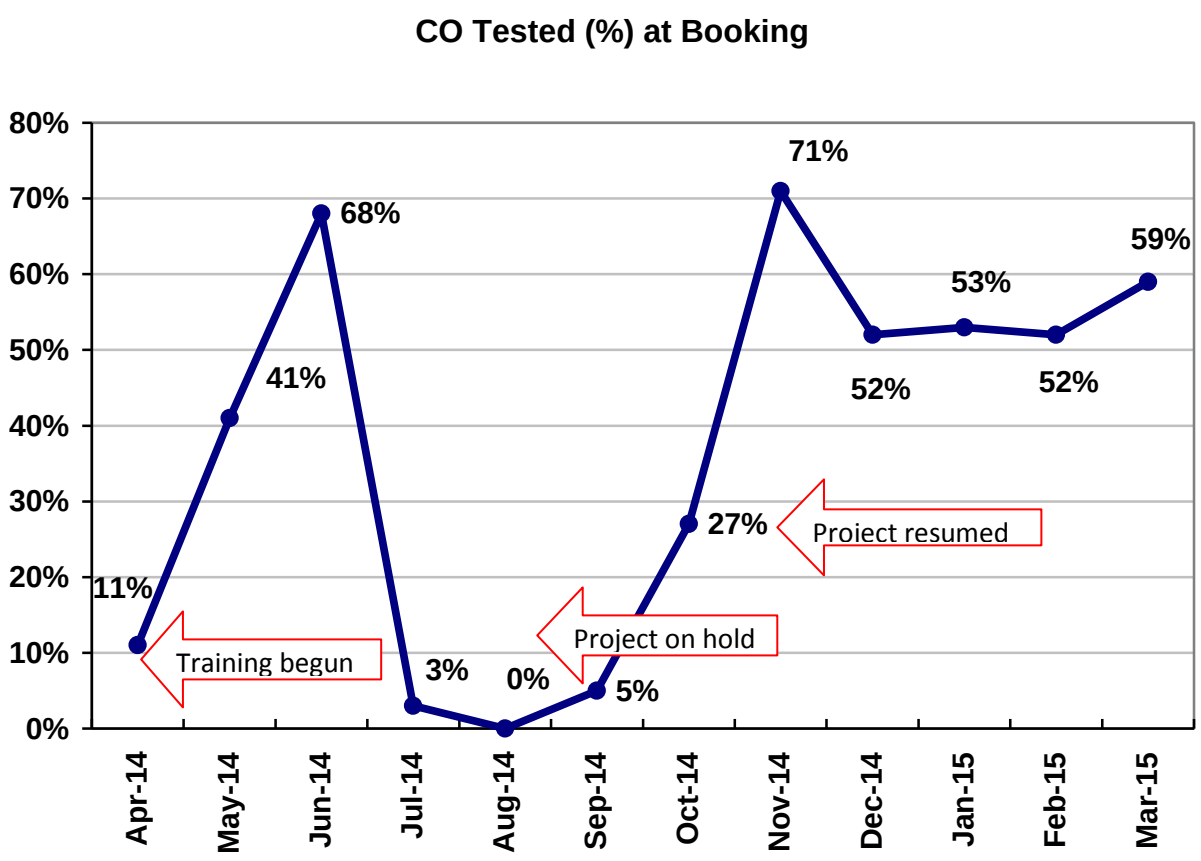
Numbers CO Tested

The highest numbers of women were CO tested during the month of November 2014 (71%).

Even when the project was placed on hold there were still a small percentage of midwives who continued to offer the test in July and September (3% & 5%).

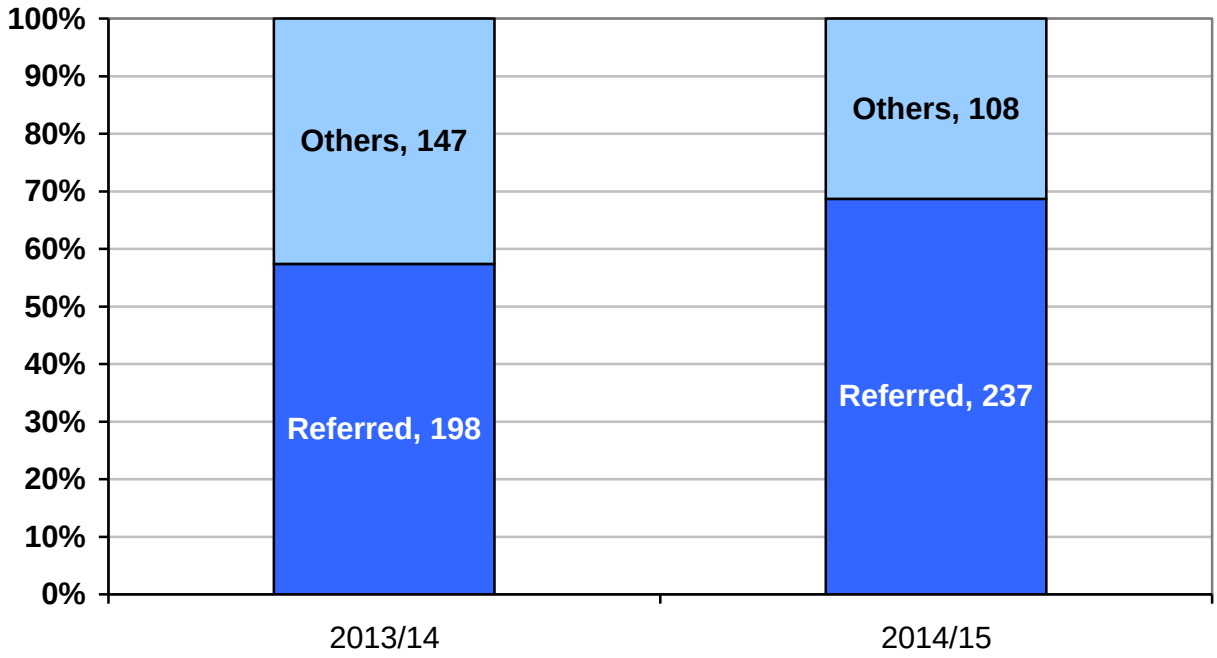
The project resumed in October with 27% of women receiving the CO test. The low take up is possibly due to information taking time to be disseminated.

December saw a drop in the number of women CO tested to 52% and it has remained consistent around this level for the rest of the year with a slight increase in March 2015 to 59%.



Referral into Specialist Stop Smoking Services

345 women were identified as smokers for the years 2013-14 and 2014-15 at Booking appointments. However, there was a marked increase of 11% in referrals into London Stop Smoking Specialist Services (SSSS) from 56% (198) to 67% (237).



The longest, uninterrupted period of testing occurred between the months of November 2014 to March 2015, resulting in an average of 57% testing.

CO Testing at 36 Weeks

The results for CO testing at 36 weeks are yet to be collated due to the three month project hiatus. It is only those women who received the test at their Booking appointment who will be followed up with the second test at 36 weeks.

Conclusion

So far the results have shown that CO testing at Booking has significantly increased the rate of referrals into Specialist Stop Smoking Services. Given that pregnant women from unskilled occupations are five times more likely to smoke than professional, the increase in referral translates into an increase in women from disadvantaged backgrounds and hard to reach groups having improved access into SSSS.

As 57% CO testing led to 11% increase in referrals, it could be argued that by achieving 95% test rate, the numbers of women referred into Specialist Services would increase further still. We believe that the lack of resources was a major obstacle to reaching a greater CO test rate. There is currently one CO monitor per nine midwives.

Recommendations

- Increase the number of CO monitors to improve compliance, particularly at the 36 week appointment
- Provision of adequate resources to achieve 80% CO testing at Booking and 36 weeks appointment
- Establish a quarterly reporting mechanism to inform each Midwifery Team of numbers of women CO tested
- It is recommended that the CO test is administered individually rather than in a group setting
- The provision of ongoing post training follow up sessions: to address any issues as they arise, these can de delivered informally at team meetings.
- Annual CO training provision for all new midwifery staff
- Protocol for managing elevated readings
- Champion midwife or midwifery support worker to identify and share best practice amongst staff
- Offer training to other staff, for example Labour Ward midwives
- Inclusion of Smoking in Pregnancy training module in mandatory midwifery training

References

1) NICE Public Health CG26, Quitting smoking in pregnancy and following childbirth 2010 National Institute for Health and Clinical Excellence www.nice.org.uk/guidance/PH26

2) Godfrey C. et al., Estimating the costs to the NHS of smoking in pregnancy for pregnant women and infants, 2010. The University of York

3) Shipton D. et al., Reliability of self reported smoking status by pregnant women for estimating smoking prevalence: a retrospective, cross sectional study, British Medical Journal 2009.

4) http://www.nhs.uk/smokefree/why-quit/smoking-in-pregnancy

Appendices

Implementing NICE Guidance

- **Action for Midwives:** Recommendation 1 **-** Referral pathway from maternity services to NHS Stop Smoking Service

"identifying pregnant women who smoke and referring them to NHS Stop Smoking services"

- Recommendation 2 - Action for GPs and other health professionals

To be done at first maternity booking and subsequent appointments:

- Assess exposure to tobacco using CO test (NB: morning readings might give low results)
- Ask if she or anybody else in the household smokes
- Use chart to establish the type of smoker she is (light, infrequent, heavy)
- Provide information on risks of maternal smoking to unborn child and of exposure to second hand smoke for both mother and baby
- Explain health benefits of stopping smoking
- Advise her to stop not just cut down
- Explain it's normal practice to refer smoking mother to NHS Stop Smoking services

Booking Letter additional paragraph

Your appointment may last up to 2 hours and offers you the opportunity to:

Talk to midwives about any aspects of your health, your pregnancy, childbirth and care of your baby

Receive information about the choice of parent education classes and breastfeeding workshops

Explore the choices available for your maternity care and if necessary referral for specialist obstetric opinion, which can be arranged at any time during your pregnancy

Be involved in the recording of your medical and obstetric history on the computerized booking system

Discuss and consider recommended screening tests including Carbon Monoxide monitoring. Carbon monoxide in the blood stream usually occurs when you are exposed to tobacco smoke or faulty gas appliances.