

How well-equipped, skilled nurses can help pregnant women to quit smoking.

Summary

In January 2019 the Family Nurse Partnership embarked on six-month quality improvement project with the aim of improving smoking quit rates for young women in pregnancy. By the end of July, there were encouraging results.

In this report, we describe the background to the project, its structure, the results, and the challenges faced along the way. We hope to provide insight for others seeking to improve quit rates, and for those embarking on quality improvement in similarly challenging contexts.

A key project goal was to build the capability of local teams to continuously improve their smoking cessation work. As such, we sought neither to prove generalisable results, nor to advocate national best practice. However, some of our findings do have national implications.

Key Findings

- A strong focus on the use of carbon monoxide monitors was not only beneficial to reducing smoking but was also – somewhat surprisingly – welcomed by smokers, who were open to engage in conversations about their smoking.
- Structured training, supporting resources (including hard-hitting images) and deliberate practice were effective in building the confidence of nurses in supporting smoking cessation.
- Underlying, environmental factors can potentially prevent expectant mothers from reaching safe carbon dioxide levels, despite them quitting smoking.
- There's a need for an agreed national standard on safe carbon monoxide levels.
- Quality improvement can be led at a distance from the point of clinical engagement, but great thought needs to be given to continuous sensitive measurement systems, nurse engagement and project management structures.
- It takes careful thought and consideration to successfully engage clients to obtain qualitative data to assess their experiences of an intervention, particularly when the subject matter (smoking in pregnancy) could be considered stigmatising.

What is FNP?

The [Family Nurse Partnership](#) (FNP) is a nurse-led, evidence-based, home visiting programme which works with vulnerable first-time parents aged under 24 (our clients) from early pregnancy up to the child's second birthday.

What is quality improvement?

Quality improvement can conceptually be considered as a: "combination of a 'change' (improvement) and a 'method' (an approach with appropriate tools), while paying attention to the context, in order to achieve better outcomes." Dhanabal (2019). There are many quality improvement methods. Arguably the most prevalent in the UK health and care system are those methods advocated by the [Institute for Healthcare Improvement](#). Amongst these, the [Model for Improvement](#) was chosen to guide this project for many reasons, not least because it advocates using data to measure the impact of specific changes, which is aligned to the [FNP National Unit](#) philosophy of carefully evaluated service development.

Project aim and structure

Project structure

Five FNP sites were involved in the project over six months. Between these sites 57 clients reached the 36 week gestation period during the project life cycle and 22 nurses took an active role in the project.

Setting the aim

The first step in the Model for Improvement is to set the aim of the improvement. After engagement with the nurses delivering smoking cessation services on the test sites, the project team agreed the following aim:

80% or more of pregnant, smoking clients would have carbon monoxide levels consistently under 3 parts per million (ppm) by 36 weeks gestation (i.e. have quit).

There is no nationally agreed safe level of carbon monoxide during pregnancy – some literature states 3 ppm (parts per million), others 4ppm. The project team and nurses engaged in a lively debate about whether 3 ppm was achievable, given environmental factors.

The 80% can be cautiously compared to 54% - a national, historical, self-reported quit rate for all clients from FNP programme data.¹

How would we know that change equals improvement?

Not all change is an improvement, but all improvement requires change. This is the premise at the heart of the Model for Improvement. So, to assess whether change really is an improvement, the model promotes the use of three measures:

1. Outcome measures - monitoring progress towards the ultimate project aim.
2. Process measures - ensuring solutions are in place and are achieving their desired effects.
3. Balancing measures - addressing any unintended negative consequences.

Clearly, we had already outlined our *outcome measure* within our aim statement.

The FNP National Unit held regular review calls with the project sites to gather qualitative feedback on how the implementation was going (*process measure*).

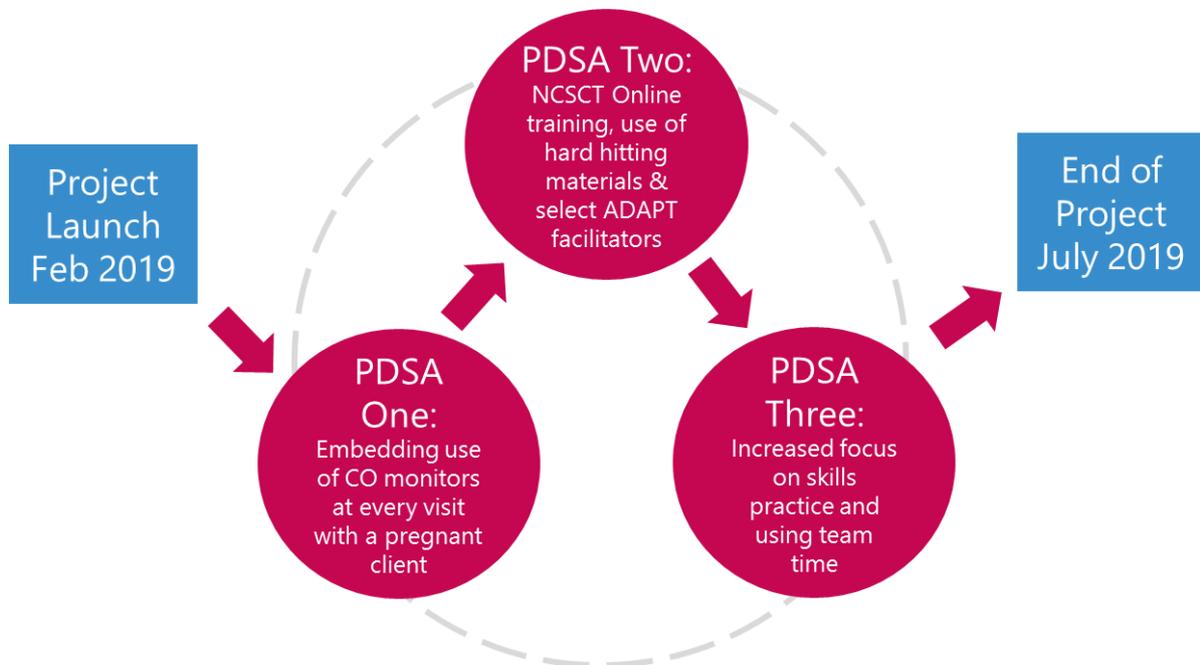
A key *balancing measure* sought to assess the impact of the project on the client-nurse relationship: would a focus on quitting smoking (holding difficult conversations) harm the burgeoning client-nurse relationship? Would nurses lose focus on other aspects of their work, as smoking was prioritised? We planned client interviews to understand this.

The project team produced a [driver diagram](#) to explore what factors might contribute towards us achieving our smoking cessation aim. This is a technique frequently used in conjunction with the Model for Improvement, to enhance our collective understanding of the system in question and to generate change ideas.

From the driver diagram it was clear that we needed a) consistent outcome measurement, and b) nurses to have a high level of confidence in their smoking cessation interventions with clients. Consequently, we added nurse confidence levels to our process measures.

¹ 54.5% of FNP clients stopped smoking by the end of Q3 2018/19, which is the highest proportion over the last three years. (FNP programme data. Source: FNP National Unit.)

With potential solutions identified, we embarked on three major cycles of improvement, using a Plan-Do-Study-Act (PDSA) methodology. Within each of these cycles, several mini cycles of planning and review were undertaken.



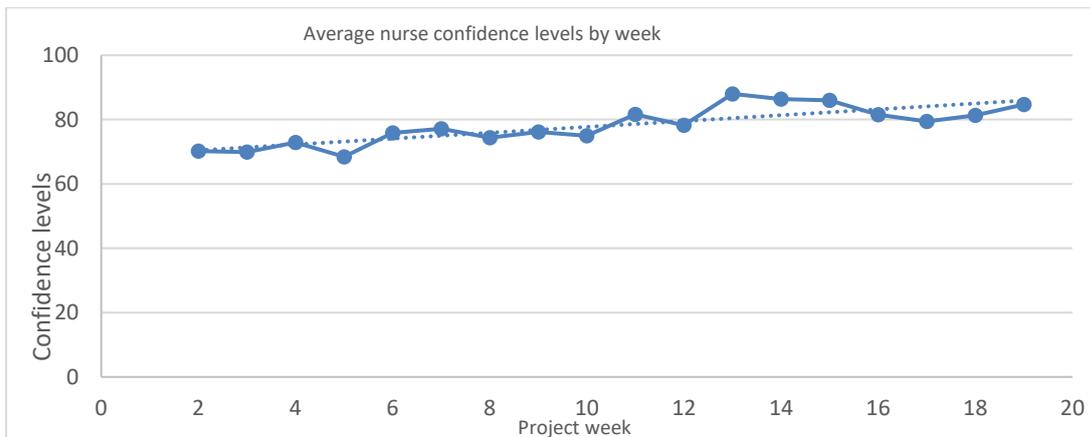
The first cycle embedded the use of carbon monoxide (CO) monitors at every visit with a pregnant client. Despite early nurse caution about how this would be received, clients were overwhelmingly positive about the use of monitors; some of their family members even volunteered to have their carbon monoxide levels checked.

The second cycle ensured that the nurses received the training and resources they needed to support their smoked cessation interventions (facilitators and hard-hitting materials). The final improvement cycle focused on the introduction and amplification of team skills practice, where teams regularly came together to role-play their interventions, fine-tuning their effectiveness.

What was the impact?

Nurse confidence levels increased

Confidence levels varied by site and by nurse, but – broadly speaking – they increased steadily throughout the project. Nurses explained each score they gave: what was helping and hindering their smoking cessation interventions.

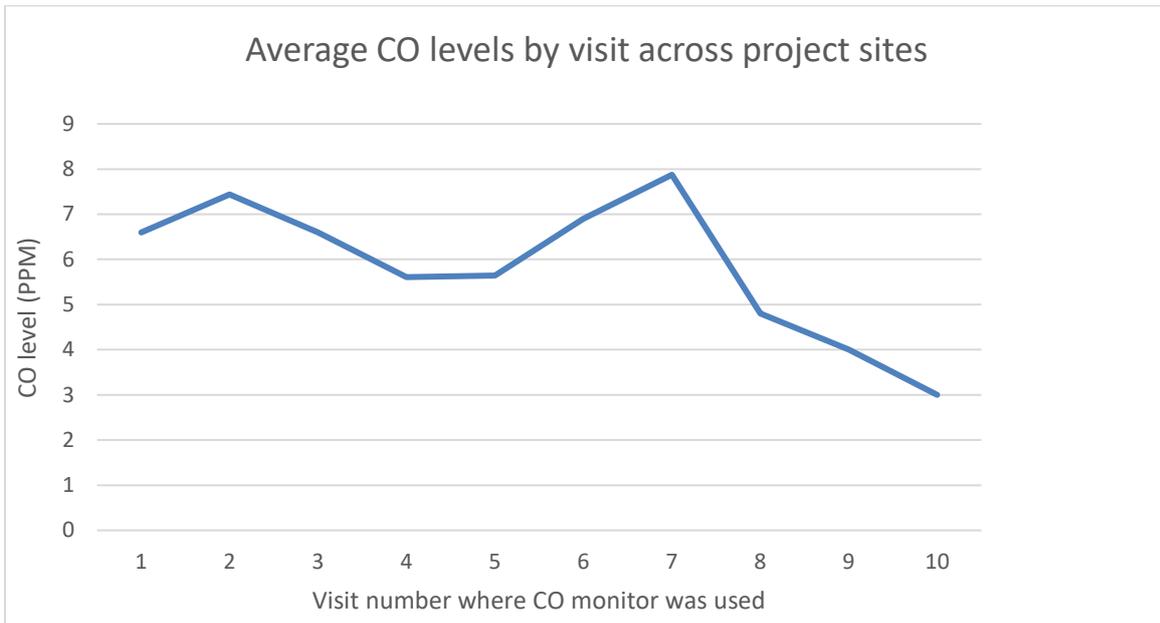


All nurses found smoking cessation training useful. The extent of this varied across sites with nurses expressing a preference for face to face training, which was not available to all. Nurses also faced challenges in balancing multiple demands; such training could not always be prioritised.

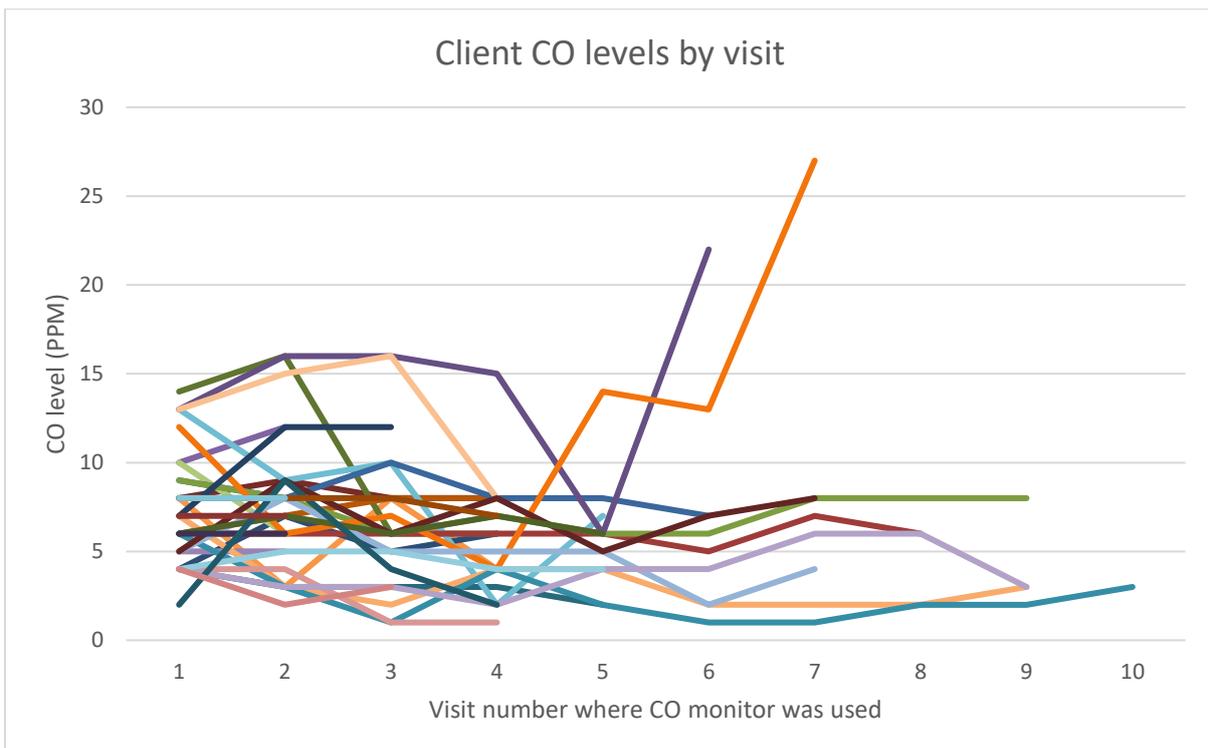
Nurses were more confident to make a successful intervention where they had good links with local smoking cessation services, or were able to prescribe nicotine replacements themselves. In addition to explaining their confidence scores, the nurses created six case studies. Common themes included:

- Smoking prevalence in family and household, which normalised smoking and was a factor in increasing the challenge to stop smoking.
- Nurses working with partners and family members to support them to stop smoking as well.
- FNP teams working collaboratively with stop smoking services to support clients (in areas where stop smoking services existed).
- High level of client motivation and engagement.
Nurses consciously utilising core FNP communication skills.

CO levels reduce with more visits



This chart shows the average carbon monoxide (CO) reading of clients, by visit number. For instance, the greatest number of visits undertaken before the 36 week gestation point was 10. And the average carbon monoxide reading on the 10th visit was 3ppm. This, however, masks variability which shows a more nuanced and complex picture:



Each coloured line presents a different client. Clearly, this shows the vast majority of clients had a reducing carbon monoxide level, with two anomalies which were due to extreme personal circumstances for those clients just before their 36 weeks gestation point.

This chart also highlights an extreme difficulty in reducing carbon monoxide levels to 0, or even less than 3. This is the case even when clients have quit smoking. It was proposed by nurses that the underlying carbon monoxide levels from passive smoking and pollution may be the cause. Whilst we do not have the data to support that conclusion we suggest a need for research in this area; it's distinctly possible that dangerous carbon monoxide levels (above 4ppm) are being maintained, despite clients quitting.

Carbon monoxide levels at 36 weeks gestation indicate improved quit rates

At the end of the project 64.1% of clients who initially smoked had a carbon monoxide reading of less than or equal to 3ppm at 36 weeks gestation. This rose to 70.5% with a carbon monoxide reading of less than or equal to 4ppm. Whilst we have to be cautious about the comparison (self-reported vs measured) the 70.5% figures represents a significant and encouraging result when compared to the self-reported baseline quit rate.

Challenges

A distinct challenge, only partially addressed within this project, is in the FNP National Unit leading quality improvement projects whilst not being directly involved with clients. In the health and care system, quality improvement is most frequently undertaken within contexts where you can immediately see the impact of improvement efforts and can physically witness the degree to which intended solutions are being adopted. This project relied on reporting mechanisms to assess the extent of implementation. This did not always run smoothly. It was concluded within the last 8 weeks of the project, that qualitative data was not enough to understand the extent to which solutions were being implemented. To counteract this, a further process measure was put in place to assess the extent of solution implementation. This measure added value, but was ultimately too late to significantly influence the project's management.

Also, our effort to introduce a balancing measure (assessing the impact on client-nurse relationships through interviews) was largely unsuccessful. We underestimated the challenge of getting clients to engage with those conducting the interviews to discuss their feelings.

The final challenge, more successfully addressed, was the typical time lag between intervention and outcome in public health interventions. Our historical measure of success (self-reported quit) could only be measured once per client at the 36 week stage. As a result, this measurement might be taken several weeks, if not months, from when a solution was implemented. To combat this problem, we focussed on frequent carbon monoxide monitoring, understanding on a visit by visit basis, the extent to which carbon monoxide measurements were shifting.

Conclusion

Before the readers considers transferring the learning we've described to other areas, it's important to recognise that this project was conducted over a short timeframe, with a limited number of smoking clients meeting the project eligibility criteria. However, feedback from our sites – from nurses and supervisors – is that they are motivated and committed to continue delivering the interventions described in this report. They have established a nurse-led community of practice to embed the work and use data to support ongoing improvement.

We've learnt that a structured quality improvement methodology can show promising results, even in an environment where processes are not clearly linked to outcomes. To achieve this, it's critical to think deeply about measuring success in a way that can detect the effects of solution implementation.

Improvement is an ongoing process. Whilst the FNP National Unit helped to facilitate this project over a defined period, efforts to hone smoking cessation interventions are – quite rightly – a focus of continuous improvement.