Final report

February 2017

Innovating for Improvement

Maternal risk assessment: management by and with pregnant women

NHS Borders

The Health Foundation

About the project

Project title: Maternal risk assessment: management by and with pregnant women SAFER (Safe Assessment Form to Evaluate Risk)

Lead organisation: NHS Borders

Partner organisation: DHI (Digital Health Institute)
NES (NHS education for Scotland)

Project lead/s:

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Part 1: Abstract

Early identification and management of the risks associated with pregnancy is essential to providing optimal treatment to pregnant women. In Scotland there are six areas that have been targeted for improved maternal care: post-partum haemorrhage, stillbirth, sepsis, venous thromboembolism, smoking cessation, and appropriate induction of labour.

Effective identification of maternal risk and its subsequent management is guided by nationally recognised evidence and best practice. However, with so much evidence and practice guidelines available, health care staff can be overwhelmed by bureaucracy and can miss key clinical factors. Risk assessment is frequently carried out in an ad hoc manner and sometimes missed out altogether.

This project aims to engage pregnant women themselves, at the earliest stage of their pregnancy, in the development of new ways of identifying and managing the risks associated with pregnancy. It will involve the creation of a community-based model that will improve outcomes for women and their families.

'SAFER' is an electronic risk assessment and risk management system that has been developed and tested by a small team of Scottish clinicians in a rural setting. It is used to assess antenatal risks and develop a comprehensive clinical management plan. This NHS Borders project will engage and involve women in the development and use of the tool. It will become a patient-held record that can dynamically assess risks and mitigate them through the production of a live patient-owned management plan.

The initiative will be initially implemented with around 60 pregnant women per month in one rural community.

The SAFER form is commenced at the antenatal booking clinic where pregnant women are asked to carry it in their notes and comment. The SAFER form is reviewed and updated at each point of contact that the woman has with her midwife or obstetrician. The forms were also tested on a daily basis using local and national guidelines by the project team using random sampling.

We have worked closely with staff in the community and the maternity unit. Through this have gained feedback using interviews and videoing. Changes to the SAFER have been made as a result of these experiences.

One of our main aims was to involve pregnant women themselves, where we have gained feedback through interviewing and videos, in order to find out what they liked, their expectations and areas where it can be improve for them.

We feel the project has been a great success; it has made our risk assessment concise and robust. We have worked closely with members of staff who are using the form. The team were based in the maternity unit and were available on a daily basis

The SAFER team have worked well together and there have been regular meetings to discuss testing, auditing and experiences using the form. We have good communication and support with our senior management whom we have kept

updated thought the project.

The project team all work within the maternity unit, we know all the staff well and have worked on previous improvement projects in the past. As a result of this we have a good working relationship with staff members both in community and in the maternity unit. This has been of great value when starting a new innovation.

From the beginning it has been very important for us to involve pregnant women in the development of the SAFER form to make sure that we are developing something that they can understand and feel they can be involved in their maternity care from the outset. We have gained much feedback from women about the form via questionnaires and videos. This has helped us to develop the form further and give us ideas what women would like on an App development.

At the beginning of the project we had to make sure that there was the necessary equipment available in the community setting. This involved the purchase of new printers for two community areas. New projects and innovation can be daunting for members of staff therefore education and reassurance was very important issue. Teaching and operating a new computer package was performed in groups or on an individual basis depending on specific learning and knowledge needs.

We have carried out a retrospective observational cohort study of 400 sets of notes to test the completeness of the form. This was challenging as our records are mainly paper based and historic records are kept off site. Initially the records were delivered to us at the main hospital but this proved to be unreliable therefore quickly we realised that it would be more efficient for us to go to the notes storage area to complete the audit.

Part of our project work has been to test the SAFER form. We took random samples of the forms to make sure that they had been started and completed correctly. Due to national and local guidelines changing, updating and suggestions from staff members and pregnant women; we are now on version 80 of the form.

All pregnant women in NHS Borders have a SAFER form during their pregnancy and are encouraged to be more involved in the management and decision making of their pregnancy. The introduction of the SAFER form has reduced the amount of paper risk assessment forms that were previously used. The SAFER form has given a clear and concise management plan for each pregnancy and the results of our audit has shown a statistically significant improvement in patient safety (see audit results section 2).

Part 2: Progress and outcomes

The SAFER form was designed and then initially tested in the booking clinic of one community area. The women in the booking clinic were informed about the new risk assessment form, its management plan, that it was to be carried in their notes and would be updated at various points during their pregnancy. Feedback was encouraged. When the form was working well in one area it was then spread to the other community areas, using the PDSA (plan, do, study, act) methodology. With changes in guidelines, testing and feedback from staff and pregnant women the form was updated. The majority of these changes have been minor ones, ranging from layout to guideline changes and at present version 80 is being used successfully.

The SAFER form was commenced at the booking clinic and updated at 24 weeks, on admission to the antenatal ward, labour ward, postnatally and at any point during the pregnancy where things may have changed. The SAFER forms that were “live” were tested regularly by the project team to check that it triggered the correct management plan and that the women received the plan of care outlined on her form.

At all points of the project we were keen to have involvement from women themselves .We therefore conducted patient experience questionnaires and videos. One of our plans was to have a patient forum with pregnant women from across the Scottish Borders so we could find out what women knew and thought about risk assessment in pregnancy. Unfortunately this proved difficult to implement as there were insufficient women willing to participate in anything other than a 1:1 discussion.

We also gained valuable feedback from staff through questionnaires and videos.

A retrospective study of notes before and after the introduction of the SAFER form was performed to ensure that the SAFER was an improvement in patient safety. The project team chose the test group, designed the audit tool, spreadsheet and applied to the audit committee within our health board.

Our maternity notes are all paper based, this meant sourcing archived notes that were needed from the maternity storage, which is located off site. Initially the notes were sent from the storage to the team for auditing but we soon realised that this was very time consuming process. It was decided that it would be more efficient for us to go to notes storage and perform the audit from there. This proved to be much more successful and aided the completion of the audit in a shorter period of time. Gathering information for the audit took approximately 6 months.

The Study

We performed a retrospective observational cohort study of 400 pregnancies from 2011-2015, with reference to UK guidelines.

The 4 main areas of the audit were;

- VTE (venous thromboembolism)
- SGA (small for gestational age)
- BMI (body mass index)
- Diabetes.

These areas were chosen because of their proven association with adverse maternity outcomes.

Retrospective study:-

- 100 sets of notes from 2011 - only 1 risk assessment was carried out which was for postnatal VTE
- 100 sets of notes from early 2014 when a check list had been introduced for SGA, BMI and diabetes.
- 100 sets of notes from late 2014 where SAFER was tested and phased in, in the community setting.
- 100 sets of notes from later in 2015 when all mothers had a SAFER form.

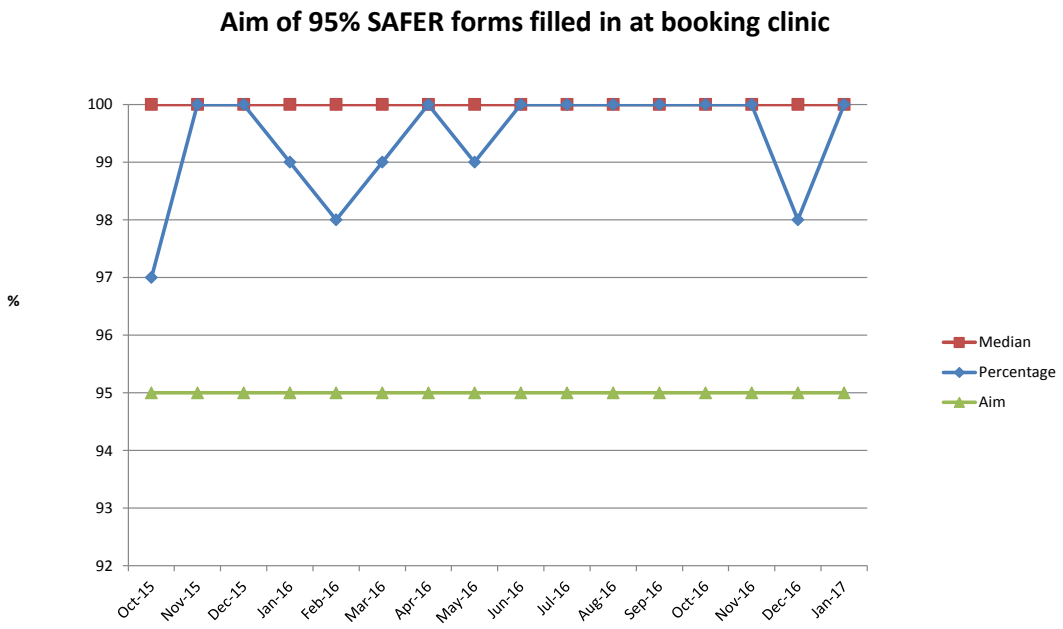
The only restriction was that the women all had to have been an inpatient at some point during their pregnancy.

There was no significant difference between age and BMI in the four groups.

- VTE – Showed an increased improvement after SAFER was introduced ($p<0.001$)
- SGA – Improved accuracy of assessment with a trend towards improved implementation ($p=0.06$)
- BMI – Risk assessment more likely to be completed correctly, ($p<0.01$)
- Diabetes - the correct tests were more likely to be carried out after introduction of the new chart ($p<0.001$).

Conclusions: Compliance with maternity guideline recommendations for VTE, BMI and Gestational Diabetes was shown to be better when the assessment was carried out electronically than when carried out either 'ad hoc' or with paper based check lists. There was also a trend towards improvement with SGA screening.

One of our process measures was to have a target of 95% of all pregnant women at first booking to have a completed risk assessment using the SAFER form. As can be seen from the run chart below this was achieved. The incidence of not being able to achieve 100% was due to bookings being carried at the woman's home or mechanical problems with computers or printers.



The SAFER form
(version 80)

Current Date	**06/02/2017**	**Expected Delivery Date**	
	CHI		
	Name		
	Gestation	Enter Expected Delivery Date	

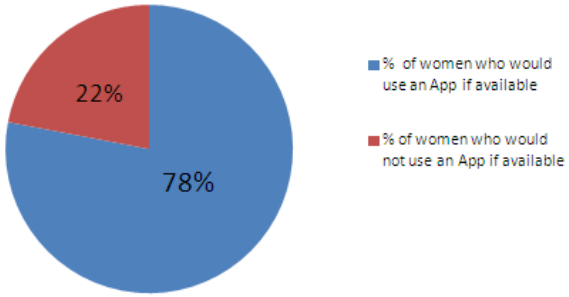
NHS BORDERS — **Safe Assessment Form to Evaluate Risks (SAFER) Chart**

Early Pregnancy / Booking		**24 Weeks and After**	
Age	Enter CHI	GpB Strep HVS or MSU this preg	
Height (m)		Number cigarettes at 24 weeks	
Weight (kg)		Gestational diabetes this pregnany	
BMI	Enter Height & Weight		
Has Thrombophilia	No	**On Admission**	
Personal history of VTE	No	Pre-eclampsia	
Family history of DVT	No	Most recent Hb (g/l)	
Parity (number >24 weeks)		Recurrent APH's	No
Medical co-morbidities	No	Induction of labour	No
Current bed rest ≥24 hours	No	Abruption	No
Gross varicose veins	No	Praevia / Accreta	No
Multiple pregnancy	No	Pyrexia in labour (>38oC)	No
Maternal bleeding disorder	No		
Previous PPH >1000mls	Yes		
Family origin	Caucasian	**Post natal**	
Previous gestational diabetes	No		
FH diabetes	No	Elective cesarean section	No
Any previous baby > 4.5 Kg	No	Emergency cesarean section	No
Any previous baby with IUGR	No	Operative vaginal delivery	No
CO level at booking		SVD / Breech	No
Current hyperemesis	No		
Current IV drug misuser	No	Baby >4Kg	No
Current infection	No	Active labour >24 hours	No
Mother or father <2.5Kg at birth	No	Post partum haemorrhage >1000	No
Previous pre-eclampsia	No	Retained placenta (>30 mins)	No
IVF pregnancy	No	Stillbirth this pregnancy	No
Fibroids	No		
Heavy bleeding early pregnancy	No		

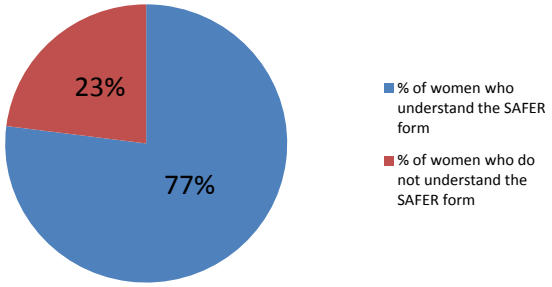
MANAGEMENT PLAN

Folic Acid	**Routine Folic Acid (0.4mg/day)**	
Screening for diabetes	**Fasting blood glucose at 28 weeks**	
Smoking Cessation	**Please Enter CO Level**	
Iron treatment	**Please Enter Haemoglobin**	
Growth assessment	**SFH 2-3 weekly from 28 weeks**	
Antenatal, keep hydrated and mobile		--
Antenatal inpatient, consider heparin prophylaxis (not early labour or IOL)		**20mg daily**
Postnatal, early mobilisation and avoid dehydration		--
PPH prevention	**Please Enter Haemoglobin**	
	-	
Intrapartum Group B Strep Rx	**Not required**	
Bladder after delivery	**Encourage spontaneous voiding**	
Free Text Notes		

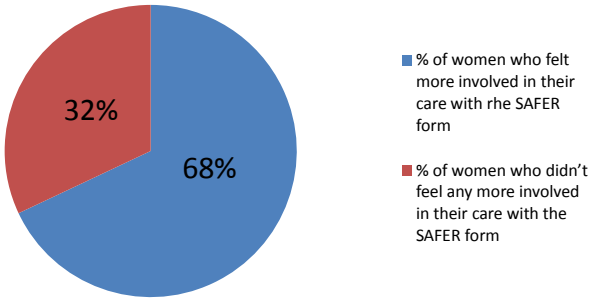
If SAFER was available in App form would you download it ?



Do you understand the SAFER form



Did you feel more involved in your care using the SAFER form?



The SAFER form has been working very well. Some staff were sceptical in the beginning and that this would increase their workload but soon realised that this was a good and safe innovation. The results of the audit have shown us that there has been an improvement in our risk assessment and subsequent patient safety. The women themselves are happy to be carrying their SAFER form and on occasions have drawn our attention to areas of the form that have not been completed or acted on.

Patient quotes

“This is my second pregnancy during my first pregnancy I didn’t have the SAFER chart. During my first pregnancy my baby was very small, he was early and there were complications which led me to being quite worried about this next pregnancy. I now have the SAFER form and it has been really useful to have that over view of the care management plan going forward, it’s been useful as its triggered the fact that I am going to be getting growth scans this time and I am going to be getting clexane postnatally”

“If SAFER was available as an App I would download it”

“Useful for older mums to see what my plan of care is and a reminder for me when I would need any extra scans”

“I didn’t know that we were risk assessed, but my community midwife explained risk assessment and the SAFER form to me. I think it’s a good idea and it has reassured me about the care I will get”

“I think the SAFER form is good and I have received all the care that was outlined in it, and now have a lovely baby”

“I think an App would be good, especially if it had information buttons on it for further reading”

Staff quotes

“The SAFER form is well laid out and easy to read, it gives us a clear management plan for each pregnancy”

“We are now used to filling out the SAFER and realise that it is a good risk assessment”.

“It’s good that the risk assessment and management plan are all in one place and are easy to read and check that the correct care has been given”

“At booking clinic it has reduced the amount of paper risk assessments we have to fill out, with less likely hood of forgetting and loosing bits of paper”

Staff experience of the SAFER form

Part 3: Cost impact

The aim of our project was not to reduce costs but to:-

- Robust risk assessment
- Increase patient safety
- Reduce morbidity
- Reduce mortality
- Engage women in their care
- Improve women's experiences

We feel that the project has been cost neutral.

- The SAFER form was developed by Dr Magowan and its development incurred relatively small printing costs
- The introduction and ongoing use of the SAFER form is now embedded as part of daily routine practice.
- Monitoring and ongoing governance of the use of the SAFER form will be integrated into routine performance structure.

The main financial cost during the project was staff wages for the 15 months duration. This was associated with the introduction and testing the SAFER form and working on our retrospective notes study. There will be no additional staff capacity required in the future as this is now embedded in to clinical practice.

The project team trained all members of staff involved in maternity care in NHS Borders on how to use the SAFER form, this included;

- 14 community midwives and 2 community support staff.
- 50 hospital based midwives
- 17 Obstetricians and medical staff

Training took place in groups or on a one to one basis depending on individual needs. New staff will be introduced to the SAFER form as part of the induction process and there will be no further cost implications for training.

The majority of the computer hardware was compatible with the SAFER form, although help was required from the IM&T department to upgrade some software. Two new printers have been purchased for two of the community areas as they did not have dedicated printers in their clinical rooms, which slowed up the

process of women being able to get their SAFER forms printed out at booking clinic. Also purchased were two new laptops for the maternity unit to help use and update the form when there is computer congestion. Laptops were chosen as they are mobile and easily used at point of contact with the women. We feel that there will be no more similar future cost implications arising from the ongoing use of the SAFER form

As a result of using the SAFER form the team have:-

- Reduced the amount of paper risk assessment forms that were previously used
- Reduced human error on filling out these forms
- Reduced Inaccurate filing leading to lost documentation
- Reduced potential inaccurate management of a pregnancy

The SAFER form has achieved greater reliability and efficiency compared to the variety of forms previously used. We feel that the long term implications of increased safety through the new SAFER form could result in fewer errors and potential litigations.

Throughout the duration of the project the team have spent time with staff and pregnant women gaining feedback about the SAFER form and what they would like in a potential App. Our experiences talking to the women were that;

- They were happy to carry their SAFER form
- Felt reassured that they were being risk assessed properly
- Felt they could ask questions about it
- Felt more involved in their care as a result of having the form.

However the majority of women would have downloaded an App if one had been available. We have explored different options, design and costing for an App development. Although this was not within the scope of this project it signifies a cost implication if SAFER moves to a technological platform.

It is difficult to measure the cost impact of the innovation, especially in the context of a relatively short term project. The results of the study have shown a more robust risk assessment throughout a woman's pregnancy which the team feel has increased patient safety, with better detection for

- Reducing morbidity in deep vein thrombosis
- The effects of raised BMI
- Identifying the small for gestational age baby

- Care of the woman with diabetes and gestational diabetes
- Assessing for post partum haemorrhage

We have also seen our stillbirth rate drop in 2016 to 1%. It is impossible to demonstrate to what extent SAFER has contributed to this given other work being carried out in this area.

Part 4: Learning from your project

We have managed to achieve what we had intended to at the start of the project. The SAFER form is embedded and working well and has developed into a robust improvement that has shown improved risk assessment and safety for our pregnant women. The project has enabled us to have allocated time and project team members to work on the improvement and without this our improvement would not be as advanced as we are now.

Some staff may have been reluctant or unsure about the innovation in the early stages. With the team being able to work closely with the midwives and doctors, they could see the benefits to the safety and care of the women they looked after with the addition of the clear and concise plan it produced they were keen to take the improvement on board.

One of our aims was to develop a smart phone App where the technology would be accessible for both women and clinicians. Our work strongly suggested that an App was best way forward, both in terms of patient safety and patient involvement. During our patient experience questionnaires and videos it was clear that the majority of women would download and use an App if one was available. The women who said that they wouldn't download an App tended to be on their second or subsequent children and felt confident in their care or didn't think they would have time to use the App.

The development of an app has taken longer than we had anticipated due to the cost implications and data protection concerns. We are now pleased to say that due to a joint venture between the University of the West of Scotland an App company (Tactuum)and a £20,000 grant from NES (NHS Education for Scotland) our App will be built for use on the internet for women and the intranet in both Android and Apple platforms. The App used by women will mean that they can access their own maternity history which will have general information on pregnancy care. We are hoping that the app will be ready in the summer of this year (2017).We will then be able to initially test the App with a small group of women.

One of our aims was to have a patient forum for pregnant women to be able to give the team feedback on the SAFER form and potential App development. Unfortunately the forum did not materialize as we had difficulty in finding women to join the forum. Perhaps the lack of volunteers was due in part to us being a small health board covering a large area where the majority of our antenatal care is performed in the community. To overcome this we did extensive patient experience questionnaires with patients in antenatal clinics, antenatal and postnatal wards and visiting parent craft classes.

Part 5: Sustainability and spread

Our intervention and project has been a great success and will be sustained beyond the funding period. The SAFER form is now embedded into our daily working lives and we no longer use any of the previous risk assessment forms. We feel this may not have been achieved without The Health Foundation funding to allow us allocated time and man power for the task.

We have been based on the maternity unit and have been visible and contactable when any queries have arisen. Our senior management is aware of the project, its successes and challenges and remains supportive of the work and has agreed that as an interim measure when the project finishes for one of the project midwives to remain in post two days a week to ensure the sustainability of the project. This interim measure which will include random sampling and auditing of the forms and help with testing and spreading in other areas. The other project team members will go back to their substantive posts within the maternity unit and will help to maintain sustainability from their clinical roles

One of the biggest challenges we faced was making sure all staff members were able to access and use the SAFER form. This was a new concept and naturally people are skeptical and anxious about new things. It did not take long for them to see that this was a good and safer intervention for them and especially for the pregnant women that they look after. Initially there was some overlapping of the old and new systems and staff were worried about the extra work it would involve. This did not last long and we soon moved to only using the SAFER form as a risk assessment.

We have always seen this innovation as being able to be replicated spread to other healthcare settings; certainly within the maternity area. The SAFER form is easily changed and updated as local and national guidelines change. It could also easily be adapted for use in the acute health setting. We work closely with the McQic work stream of the Scottish patient Safety Programme where there is representation from all health boards in Scotland. They have had many networking events and learning sessions over the last four years and they have followed the development of the SAFER form in recent years with great interest. Dr Magowan has given many talks on risk assessment and the SAFER form at these events which have all been very well received. This collaboration has recently led to a large Scottish health board`s interest in the testing and spreading of the SAFER form in their area. This would be an exciting opportunity for us and other health boards but would require further funding.

The project team has spoken at local and national events and our project was well publicized in the local news papers and television. In May 2016 the “SAFER team” won a NHS Borders staff award for Innovation and Improvement, which we were all delighted about. In November we were also shortlisted for an Innovation award at a patient safety national (Scotland) event. Dr Magowan has recently submitted an article on the project to the BJOG (British Journal of Obstetrics & Gynaecology)

NHS Borders staff awards 2016

The innovation and improvement award recognizes an individual or team who has implemented change, through inspired, creative or original thinking, which has improved the experience of patients, families or colleagues. It was awarded to Dr Brian Magowan and the SAFER team who has designed an electronic risk assessment tool called SAFER. This in an innovative way of keeping up to date information as pregnancy progresses to support early identification and management of risk associated with pregnancy, in order to provide the best possible care to pregnant women.

Appendix 1: Resources and appendices

Staff questionnaire

SAFER (Safe Assessment Form to Evaluate Risk)

Q1 What do you like about the SAFER form?

Q2 What do you not like about the SAFER form?

Q3 Do you find the form easy or hard to use?

Q4 Would you make any improvements?

Q5 Do you think the SAFER form is a better or worse risk assessment than the previous separate six A4 sheets with tick boxes?

Comments: