



BEST PRACTICES IN EFM DEFINITION, INTERPRETATION, AND MANAGEMENT

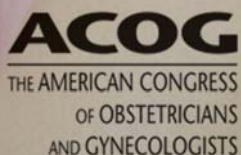
A STATEWIDE CAMPAIGN TO STANDARDIZE
ELECTRONIC FETAL MONITORING EDUCATION

FINAL REPORT ■ May 2011

A COLLABORATION OF



Healthcare Association
of New York State



EXECUTIVE SUMMARY

New York State's Obstetric Safety Initiative: Providing Excellence in Electronic Fetal Monitoring (EFM) was a two-year quality improvement initiative with the goal of improving fetal outcomes and reducing liability exposure in New York State by standardizing the methods by which obstetric team members define, interpret, communicate, document, and manage fetal heart rate tracings. Improving staff competencies in this area is of critical importance because EFM can warn the obstetric team

of potential fetal complications, enabling clinicians to take action to avert or mitigate adverse outcomes.

Through the provision of regional train-the-trainer programs and subsequent ongoing education and program support, multi-disciplinary obstetric teams at the participating institutions worked to educate their obstetric staff and implement a standardized approach to EFM interpretation and management.

The *Initiative* achieved tremendous success; highlights are illustrated below:

- Nearly 400 multi-disciplinary obstetric providers attended the *Initiative's* train-the-trainer programs, which were effective in improving and sustaining EFM knowledge.
- The majority of “trainers” used the knowledge obtained to educate other staff at their institutions, achieving a mean educational penetration of 95% for nurses and 78% for physicians receiving standardized EFM training at participating hospitals.
- As a result of the *Initiative*, at least 382 obstetric providers in New York State are now certified in EFM by the National Certification Corporation (NCC).
- At least 38% of participating hospitals linked EFM competency to clinical privileging and re-credentialing requirements.
- Nearly all (94%) hospitals implemented one or more practice improvements as a result of the *Initiative* and these intermediate process improvements have already and will continue to contribute to improved patient outcomes.
- The *Initiative* illustrated that requiring EFM credentialing and providing multi-disciplinary EFM education can help reduce challenges associated with physician engagement, and improve adoption and implementation of certain practice changes.
- The *Initiative* enhanced the safety culture in participating hospitals, which reported significant improvements in both team communications and collaboration.

INTRODUCTION

New York State's Obstetric Safety Initiative: Providing Excellence in Electronic Fetal Monitoring was the first phase of an obstetric quality improvement initiative that was conducted from December 2008 through March 2011. This phase of the *Initiative* focused on EFM, providing multi-disciplinary hospital obstetric teams with vital training on how to interpret, communicate, and effectively respond to fetal heart rate (FHR) tracings. Eighty-six hospitals from across the state, representing large academic teaching hospitals and smaller community hospitals, participated in the program.

EFM is the most common method of intrapartum surveillance, used in approximately 85% of births nationwide. Appropriate utilization and a standardized approach to interpretation of EFM can warn the obstetric team of potential fetal complications that may lead to injury, including brain damage or death.

Unfortunately, hospital obstetric teams have not universally implemented a standardized approach to interpreting and managing EFM. Variation in the interpretation of FHR tracings and poor communication of FHR patterns can contribute to adverse perinatal outcomes to the mother and baby and lead to communication, trust, and patient safety issues among caregivers.

The *Initiative's* goal was for obstetric providers throughout New York State to use a standardized approach to EFM definition, interpretation, and

management, thereby improving fetal outcomes and reducing liability exposure for hospitals and other organizations.

A collaboration of Healthcare Educational and Research Fund, Inc., an educational affiliate of HANYS; the American Congress of Obstetricians and Gynecologists (ACOG), District II; and New York State Department of Health (NYSDOH), the *Initiative* was generously funded by the New York State Health Foundation. The *Initiative* was also guided by a multi-disciplinary expert EFM Task Force of clinicians and hospital administrators. While the first phase of the *Initiative* has concluded, a second phase is under development to focus on other areas of obstetric safety.



THE INITIATIVE'S APPROACH

Train-the-Trainer Education Programs

Through regional train-the-trainer programs held during the summer of 2009, obstetric teams from participating hospitals were provided with education to standardize the definition, interpretation, communication, and management of FHR tracings within hospital obstetric units. The education programs provided in-depth training on the use of tools and related techniques, such as crew resource management principles, to overcome implementation and communication barriers, and also provided a component on the legal implications of EFM. The programs were presented by nationally renowned faculty in EFM education and legal implications, David Miller, M.D., F.A.C.O.G., and Lisa Miller, C.N.M., J.D. A resource kit, complete with training module slide presentations, post-test questions, and research materials was provided to all participants as a standardized resource to be used to disseminate the training to their obstetric colleagues.

Ongoing Support and Education

Following the educational sessions, the participants educated their hospital peers to use the standardized National Institute of Child Health and Human Development (NICHD) EFM nomenclature.

Over the next year, HANYS worked in collaboration with ACOG and NYSDOH to help hospitals implement EFM training at their facilities using a multifaceted approach that included Web-conferences designed to educate and address implementation issues, monthly electronic communication, incentives to take the NCC EFM exam, and offering technical assistance from clinical advisors.

Certification Exam in EFM

The *Initiative* also offered select individuals from each institution the opportunity to take the NCC EFM examination and receive reimbursement for exam registration costs. The exam provided hospitals a tool to assess staff competency on the visual interpretation of FHR tracings. Hospitals' experience with the exam helped them determine if they would pursue it as a method to assess staff competency in the future. To help obstetric staff prepare for the exam, HANYS offered three Web-based NCC EFM review sessions presented by the *Initiative's* clinical advisors.



Data and Reports

Hospitals reported data to HANYS pertaining to their culture of safety, perinatal indicators, and in-house education programs. Utilizing these data, HANYS developed and disseminated confidential, blinded, hospital-specific comparative reports to each hospital participating in the *Initiative*. The reports served as a valuable tool, enabling participating hospitals to benchmark themselves against their peers in New York State.

EFM eToolkit

At the conclusion of this phase of the *Initiative*, a Web-based EFM eToolkit was developed to provide obstetric staff with up-to-date information on evidence-based research and additional resources to ensure ongoing EFM competency.



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EVALUATION

Several methods were used to analyze the impact of this *Initiative*, including evaluation of the education programs, pre- and post-tests of train-the-trainer participants, and a final evaluation survey.

The final evaluation survey was distributed to the lead point people at each institution. The response rate of 65% was representative of the various types of participating hospitals. A small, non-monetary incentive was used to encourage institutions to respond to the survey.

RESULTS

HIGHLIGHTS AND LESSONS LEARNED

- Train-the-trainer programs can be an effective method to broadly disseminate education when the trainers are comprised of multi-disciplinary providers and when their institutions prioritize EFM training.
- The vast majority of survey respondents (89%) stated that attendees of the train-the-trainer programs educated staff at their institutions.
- Respondents reported that an average of 95% of nurses and 78% of physicians at their facilities received standardized EFM training.
- All survey respondents agreed the *Initiative* provided them with valuable tools necessary to train staff in standardized EFM interpretation and management.
- All survey respondents agreed that the training was directly applicable to their clinical duties.

Train-the-Trainer Programs

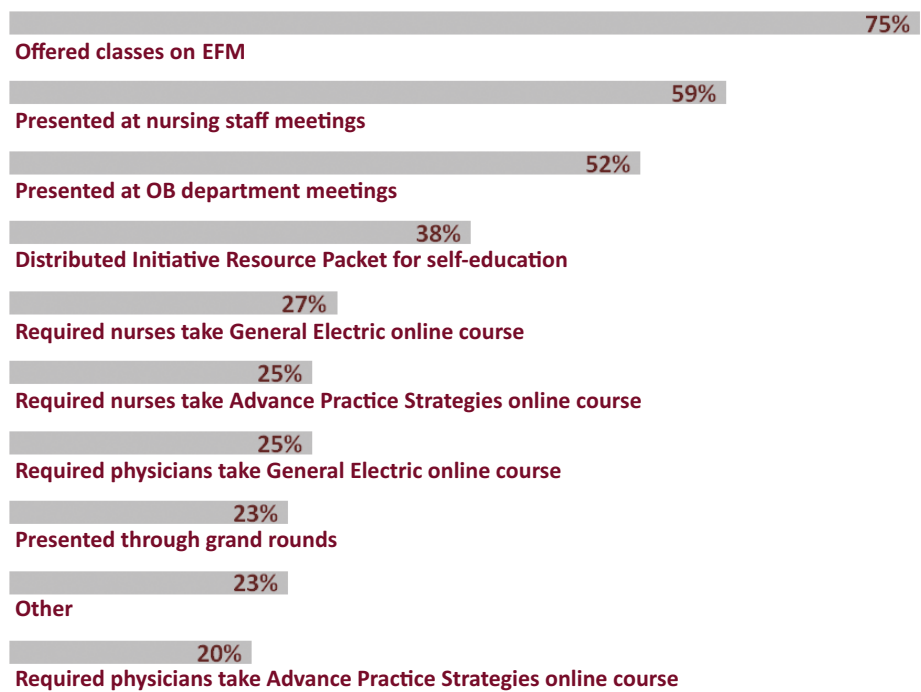
Nearly 400 obstetric providers, including physicians, nurses, and midwives were trained to use a standardized nomenclature for interpreting and communicating EFM through the six train-the-trainer education programs provided across New York State. The programs received outstanding reviews, with an overall satisfaction score of 4.91 out of a possible 5.0.

The program goal was not only to teach providers EFM interpretation and management, but to give them the tools and resources needed to educate others in their individual obstetric units. Participants expressed a commitment to train their obstetric teams and, according to a final evaluation survey, the majority of trainers fulfilled this commitment.



FIGURE 1:

Methods of Education



HIGHLIGHTS AND LESSONS LEARNED

- Hospitals used a multi-pronged approach to educate staff on EFM interpretation and management.
- Slightly more than half (56%) of survey respondents conducted a multi-disciplinary approach to EFM education involving physicians and nurses. Benefits of multi-disciplinary education are numerous, and it is hoped more hospitals follow this approach in the future.
- There is a growing trend in New York State to link EFM competency to privileging and re-credentialing: 78% of survey respondents said the *Initiative* made their hospital consider making EFM competency part of credentialing and privileging; and at least 38% implemented this requirement.

Education Techniques

The *Initiative* emphasized that hospitals should use a multi-faceted approach to educate obstetric staff, and the survey results indicate that hospitals followed that approach. Seventy-five percent of respondents indicated that they offered focused classes on EFM (see Figure 1).

Another method to ensure providers are educated and competent in standardized EFM interpretation and management is to link EFM competency to privileging and re-credentialing for physicians and midwives. As part of the *Initiative*, HANYS and ACOG promoted the development of organization-specific education and competency requirements in EFM, which may include privileging and credentialing criteria.

Throughout the *Initiative*, the value of inter-disciplinary education was

promoted by encouraging hospitals to train nurses and physicians together. Our final evaluation indicated that 56% of respondents did, in fact, conduct inter-disciplinary EFM training.

As a result of efforts by HANYS, ACOG, and NYSDOH, more than 38% of hospitals in the *Initiative* made EFM education and competency a requirement for clinical privileging and re-credentialing. This is an increase from the interim evaluation conducted in April 2010, which placed this requirement at 23%.

Hospitals employed a variety of approaches to implement the credentialing requirement, including requiring an annual EFM post-test, certification via the NCC EFM exam, or completion of an online EFM education course, which the *Initiative* promoted as another method to educate obstetric staff.

Education Implementation Challenges

The EFM education was successfully implemented, as measured by changes in test scores and the percentage of staff who passed the NCC exam.

However, hospitals still faced barriers in their efforts to standardize practice, including lack of physician engagement and leadership, and lack of professional time available to disseminate the education (see Figure 2).

FIGURE 2:

Education Implementation Challenges

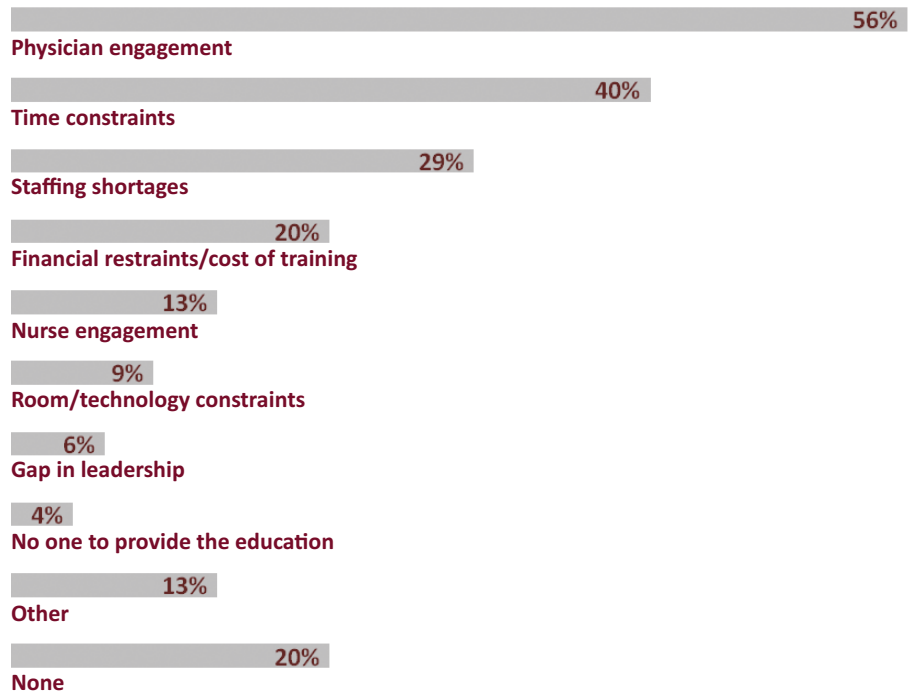
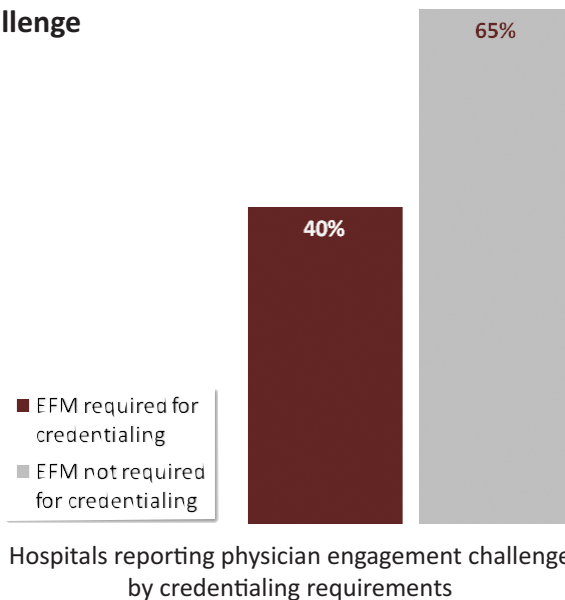


FIGURE 3:

Implementation Challenge by Credentialing Requirements



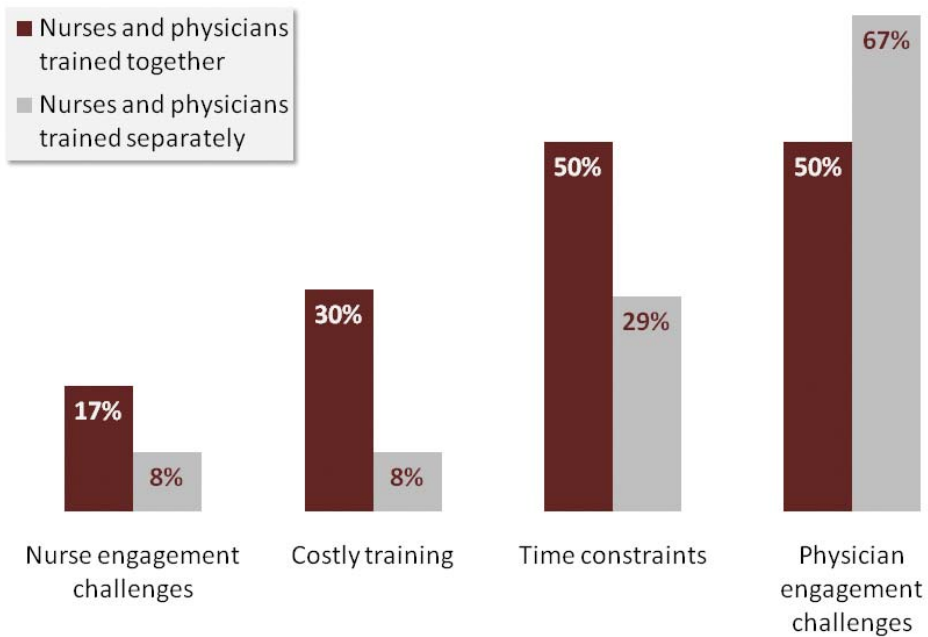
In analyzing the final evaluation results, the project team found that when nurses and physicians train together or when hospitals require EFM competency for credentialing, hospitals' challenges associated with physician engagement can be reduced (see Figure 3).

HIGHLIGHTS AND LESSONS LEARNED

- Physician engagement challenges and time constraints were the most common challenges in implementing EFM education at the participating institutions. More work needs to be done to elicit physician support and prioritize EFM education and training.
- EFM credentialing and multi-disciplinary education can improve physician engagement; however, those methods alone are not enough.
- Multi-disciplinary education can be more challenging to implement; however, as noted in later results, the benefits can be significant.

However, providing multi-disciplinary education can result in additional challenges in some areas compared with training providers separately. These include additional time constraints, higher training costs, and challenges associated with nurse engagement (see Figure 4).

FIGURE 4:
**Implementation
Challenges by Training
Approach**



EFM Pre- and Post-Tests

To assess the trainers' knowledge and retention following the train-the-trainer EFM education programs, the project team administered a test before the start of the training program, followed by a test at the end of the training program—the post-test was offered again at six and 18 months following the pre-test.

The pre-test demonstrated a noteworthy gap in knowledge among participants and demonstrated a significant need for education and training in a standardized approach to EFM definition, interpretation, and management

(see Figure 5). The average percent of correct responses for the pre-test was only 49%.

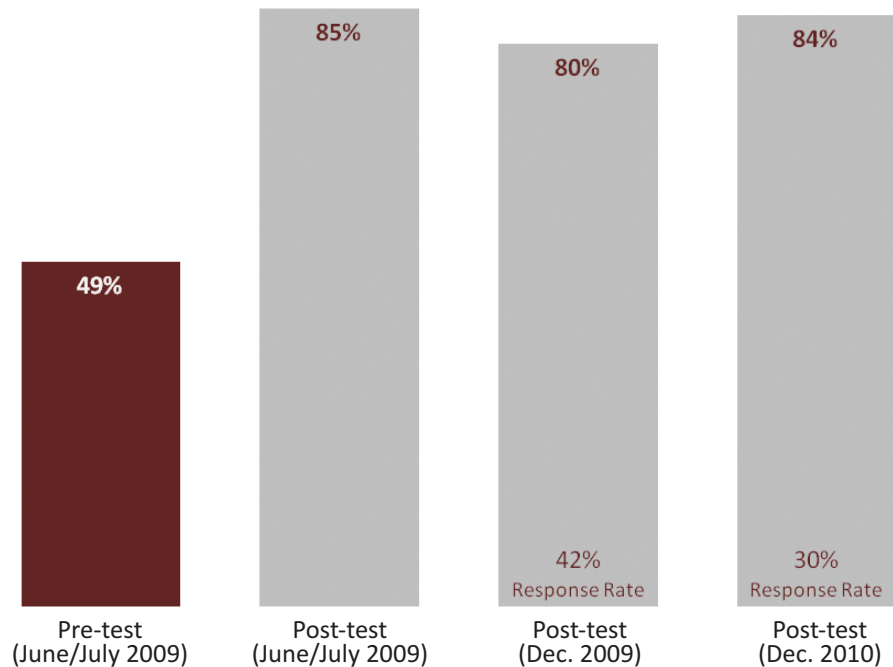
The *Initiative* team observed substantial improvements in post-test results, indicating that the education was highly effective in improving knowledge. More importantly, the knowledge was retained as a result of clinicians using the standardized nomenclature. Comparing the pre-test to the post-test administered in December 2010, more than a year later, the average percent change increase in correct responses was a remarkable 104%.

HIGHLIGHTS AND LESSONS LEARNED

- The education programs were effective in improving EFM knowledge as evidenced by improvement in test results.
- While the post-tests showed improvement, continued reinforcement and repetition of the NICHD terminology and definitions is needed to sustain knowledge over time.

FIGURE 5:

EFM Pre-Test and Post-Test Mean Percent of Correct Responses



HIGHLIGHTS AND LESSONS LEARNED

- At least 382 obstetric providers in New York State are now certified in EFM, representing a 75% pass rate for test takers. This number is consistent with the national average.
- The *Initiative* successfully encouraged more obstetric staff to take the NCC EFM exam.

NCC EFM Exam Results

Select individuals from each institution were given the opportunity to take the NCC EFM exam and receive reimbursement for the exam registration costs. While HANYS reimbursed 169 individuals for the cost of the exam, at least 510 providers, including nurses, physicians, and midwives took the exam since the summer of 2009. Of these providers, 382 (75%) passed, which is consistent with the national average.

Moreover, 76% of survey respondents agree that participation in the *Initiative* was instrumental in encouraging some of their obstetric staff to take the NCC EFM exam, accomplishing one of the major objectives of the *Initiative*.

Building a Culture of Safety

One of the objectives of this *Initiative* was to encourage a culture of safety within each obstetric department and unit. The regional train-the-trainer education programs provided hospitals with tools to assist in improving their patient safety culture, including incorporating crew resource management principles.

Importantly, the *Initiative* also enabled hospitals to distribute the nationally

recognized and validated *Agency for Healthcare Research and Quality (AHRQ) Hospital Survey* to multi-disciplinary obstetric staff via an on-line, Web-based tool. The *AHRQ Hospital Survey* provides hospital leaders with the basic knowledge needed to conduct an effective safety culture assessment. It can be used to track changes in patient safety over time and to evaluate the impact of patient safety interventions, such as EFM education and training.

The *AHRQ Hospital Survey* was offered twice during the *Initiative*; while participation was voluntary, 60 hospitals chose to respond. The project team was pleased with this response rate because a number of hospitals were already conducting a culture of safety survey and were thus unable to participate in another survey through this *Initiative*.

While the timeframe for this *Initiative* was insufficient to decipher trends and changes in the *AHRQ Hospital Survey* results, according to the final evaluation, a remarkable 96% of respondents agreed that the *Initiative* helped improve their culture of safety.

A major component contributing to a culture of safety is improved communication among providers. Nearly all (95%) survey respondents agreed that the *Initiative* improved inter-disciplinary communication and collaboration related to EFM.

HIGHLIGHTS AND LESSONS LEARNED

- Providing vital training on how to interpret, communicate, and effectively respond to FHR tracings can help improve an obstetric unit's patient safety culture, including improved inter-disciplinary communication.
- Ninety-six percent of survey respondents agreed that the *Initiative* helped improve their culture of safety.

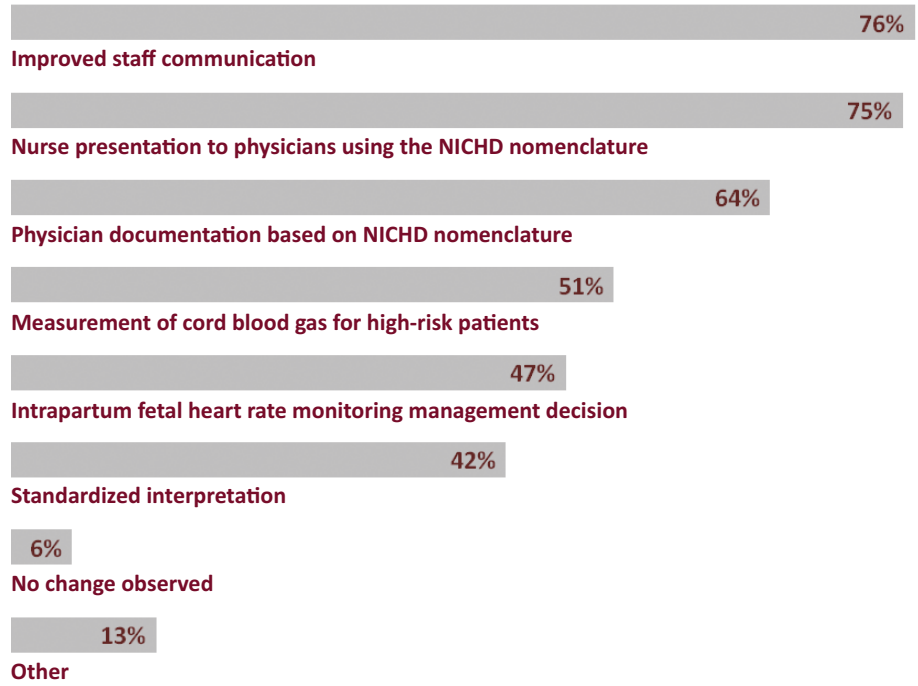
Practice Improvements

When surveyed, 94% of participants indicated that they implemented one or more practice improvements as a

result of this *Initiative*. It is anticipated that such improvements will lead to improved outcomes in the future (see Figure 6).

FIGURE 6:

Practice Improvements Implemented



HIGHLIGHTS AND LESSONS LEARNED

- The method used to disseminate and encourage EFM education can impact the effectiveness of the program in improving practice.
- Nearly all (94%) survey respondents indicated that they implemented one or more practice improvements.
- Hospitals implemented a greater percentage of certain practice improvements if EFM competency was tied to credentialing or they provided multi-disciplinary EFM education.
- The overall improvement in staff communication was greater in hospitals that tied EFM competency to credentialing and in hospitals that provided multi-disciplinary EFM education.
- Despite the additional challenges presented by multi-disciplinary EFM education, it appears that overcoming those challenges can lead to better practice improvements.

Practice improvements varied depending on whether a hospital linked EFM competency to credentialing and whether a hospital implemented multi-disciplinary EFM training (see Figure 7). Both approaches appeared to have significant impacts on the types of practice improvements implemented. The most dramatic results can be found in the perceived improvement in interdisciplinary communication, with both EFM credentialing requirements and multi-disciplinary training yielding better results (see Figure 8, next page).

FIGURE 7:

Practice Improvements by Hospital Credentialing Requirements

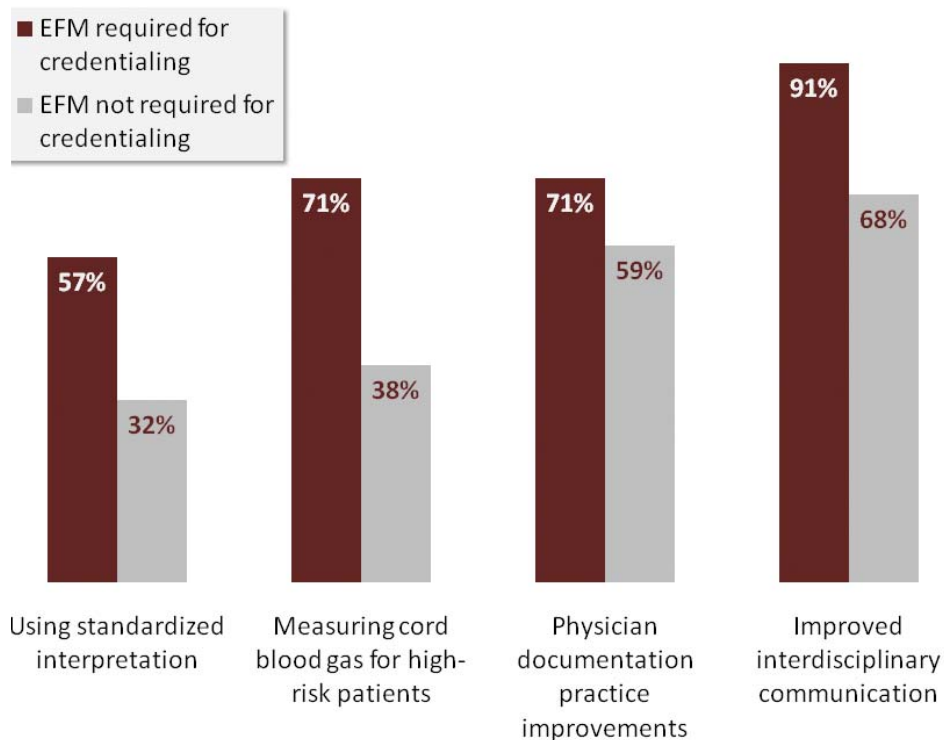
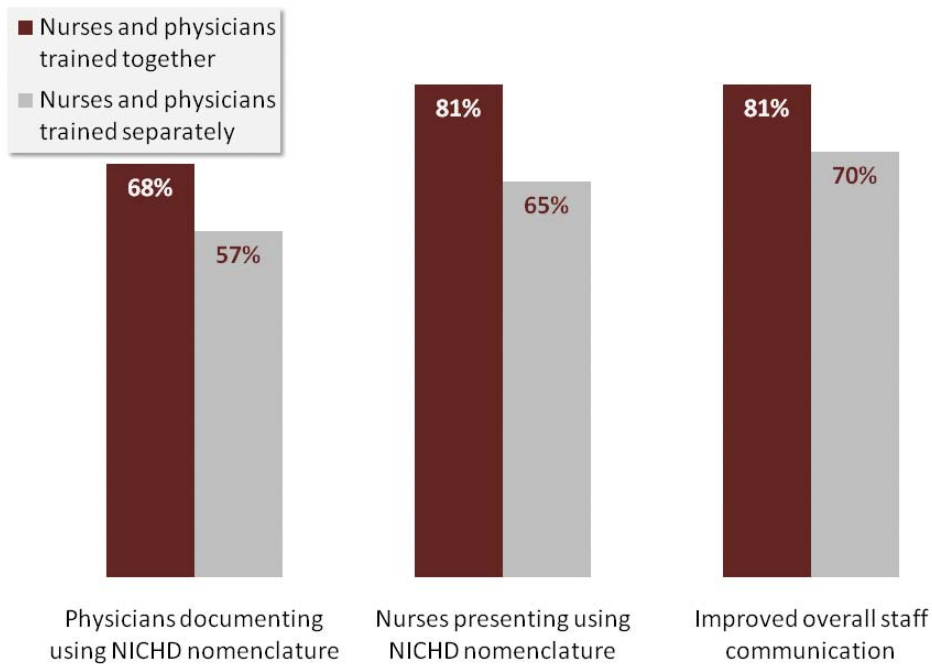


FIGURE 8:

Practice Improvements by Training Approach**Perinatal Indicators**

Analysis of perinatal outcomes for this *Initiative* was a significant challenge, primarily due to a combination of the low volume of “events” in obstetrics and the short timeframe for analyzing data. In addition, it required several months to a year for participants to fully implement and conduct the training at their institutions.

Hospitals were asked to submit perinatal indicator data over a two-year period, including baseline data. The perinatal indicator portion of the *Initiative* was vital to help hospitals benchmark themselves against their peers and begin to trend their indicators over time. HANYS is examining methods to continue to collect data following the conclusion of this phase of the *Initiative*.

HIGHLIGHTS AND LESSONS LEARNED

- While the *Initiative* was not yet able to demonstrate improvements in perinatal outcomes due to the short timeframe, it is anticipated that the intermediate process improvements will help improve outcomes in the future.

Sustainability

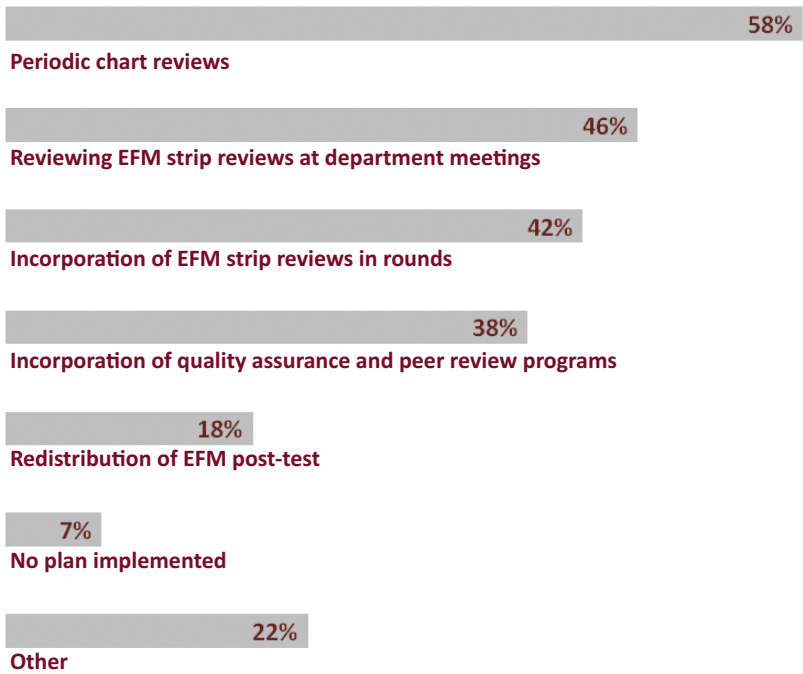
This program has had many successes; however, the key to sustainability is continued quality improvement. Many of the *Initiative’s* Webconferences focused on methods to sustain ongoing

EFM education and competency.

According to the final survey, 93% of respondents implemented initiatives to assess ongoing quality and competency in EFM interpretation and management (see Figure 9).

FIGURE 9:

Quality Improvement
Methods for EFM



HIGHLIGHTS AND
LESSONS LEARNED

- Ninety-three percent of respondents indicated they have implemented at least one method to monitor ongoing EFM competency. This demonstrates that hospitals are committed to maintaining EFM competency over time.

It is the hope of the project team that the *Initiative’s* Web-based EFM eToolkit will keep obstetric providers up to date and current on the latest evidence-based research and provide them with additional tools to sustain ongoing EFM competency. The toolkit, available at www.acogny.org, includes an EFM tuto-

rial, a resource center, and various assessment tools to help hospitals implement EFM education and training at their institutions. The toolkit will continue to be accessible on the ACOG District II Web site to all obstetric providers, their staff, and the public in New York State and across the country.

CONCLUSION

New York State's Obstetric Safety Initiative: Providing Excellence in Electronic Fetal Monitoring was one component of a broader patient safety agenda in obstetrics. By working together, HANYS, ACOG, and NYSDOH were able to provide participating hospitals an opportunity to enhance staff competency in the interpretation, communication, and management of FHR tracings based on the standardized nomenclature.

Hospitals participating in this patient safety collaborative reported improvements in multi-disciplinary communications, clinical practice, and overall EFM knowledge, demonstrating that this

Initiative is effective in helping to enhance the culture of safety in hospitals.

While there were several successes with this *Initiative*, significant changes in practice on obstetric units take time, and ongoing education and continued quality improvement are essential for continued success.

While working to improve obstetric care in New York, this program has the potential to serve as a model for other education programs around the country. HANYS, ACOG, and NYSDOH will seek opportunities to broadly disseminate and publish the *Initiative's* findings.

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