**2023 Nudge Unit Request for Proposals Application Form**

**Example Application**

**Team Information**

1. Team lead
   1. Name

[Name]

* 1. Email address

[Penn email address]

* 1. Role

Asst Prof, OB/Gyn

* 1. Where do you work? Complete all that apply.
     1. Division(s) Maternal Fetal Medicine
     2. Department(s) Obstetrics and Gynecology
     3. Practice(s)
     4. Hospital(s) HUP / PAH
     5. Floor(s)
     6. Unit(s)

1. List the names of any other team members.

[Name(s)]

1. We would like to get a sense of your team’s resources. For Yes responses, please describe briefly.
   1. Does your team have available research staff (e.g. research coordinator and/or project manager) to support this project?

Our research team is available for funded projects. This project is currently not backed by specific funding so the answer would be no at this time.

* 1. Does your team have direct access to a data analyst to pull baseline and evaluation data and perform statistical analyses?

I do not have access to an analyst to pull data, but as PI, I have a Master of Science in Clinical Epidemiology and can perform the needed statistical analyses for this project.

* 1. Does your team have experience publishing quantitative quality improvement studies in peer-reviewed literature?

Yes. See recent bibliography of QI work:  
  
Arias MP, Wang EY, Leitner K, Sannah T, Keegan M, Delferro J, Iloure C, Arimoro F,  
Streaty T, Hamm RF: The Impact on Postpartum Care by Telehealth: a retrospective  
cohort study. Am J Obstet Gynecol MFM 4(3): 100611, May 2022.  
  
Hamm RF, Wang EY, Levine LD, Speranza RJ, Srinivas SK: Implementation of a protocol  
for management of antepartum iron deficiency anemia: a prospective cohort study. Am  
J Obstet Gynecol MFM 4(2): 100533, Mar 2022.  
  
McCoy JA, Gutman S, Hamm RF, Srinivas SK: The effect of an Enhanced Recovery After Cesarean pathway with standardized discharge prescriptions on opioid use and pain  
experience after cesarean delivery. Am J Perinatol 38(13): 1341-1347, Nov 2021.  
  
Hamm RF, Srinivas SK, McCoy J, Morales K, Levine LD: Standardized cesarean risk  
counseling with induction: impact on racial disparities in birth satisfaction. Am J  
Perinatol Nov 2021 Notes: Online ahead of print.  
  
Hamm RF, McCoy J, Oladuja A, Bogner HR, Elovitz MA, Morales KH, Srinivas SK, Levine  
LD: Maternal morbidity and birth satisfaction after implementation of a validated  
calculator to predict cesarean during labor induction. JAMA Network Open 3(11):  
e2025582, November 2020.  
  
Quant HS, Hamm RF, Schwartz N, Srinivas SK: A multidisciplinary approach to improving  
process and outcomes in unscheduled cesarean deliveries. Am J Obstet Gynecol MFM  
2(1): 100070, February 2020.  
  
Hamm RF, Wang E, O'Rourke K, Romanos A, Srinivas SK: Institution of a Comprehensive  
Postpartum Hemorrhage Bundle at a Large Academic Center does not Immediately  
Reduce Maternal Morbidity. Am J Perinatol 36(1): 15-21, Jan 2019.  
  
Hamm RF, Wang E, O'Rourke K, Romanos A, Srinivas SK: Implementation of  
quantification of blood loss does not improve prediction of hemoglobin drop in  
deliveries with average blood loss. Am J Perinatology 35(2): 134-139, Jan 2018.

**Project Overview**

1. Project title

Increasing utilization of a calculator to predict cesarean risk during labor induction, an evidence-based tool for reducing maternal morbidity on labor and delivery

1. Clinical area (e.g., department, procedure, disease, etc.)

Labor & Delivery, cesarian section

1. Problem type (e.g., screening, workflow, evidence-based practice, patient experience, etc.)

Evidence-based practice, calculator

1. Provide an executive summary of your project (2-3 sentences).

Clinicians do not regularly use an evidence-based calculator for determining cesarean risk in eligible patients undergoing labor induction. We propose an automated tool in EPIC that screens for eligible patients at HUP and PAH, alerts OBGYN and family medicine providers about eligible patients, and performs the cesarean risk calculations.

**The Problem**

1. Describe the problem you seek to solve, providing evidence and data (from Penn Medicine or broadly) wherever possible to explain why it is big and important.
2. Describe the problem (e.g., care gap or behavioral process) you are trying to address with a nudge.

The purpose of this nudge is to increase utilization of a calculator to predict cesarean risk during labor induction, an evidence-based tool for reducing maternal morbidity on labor and delivery.

1. Describe the evidence base for this problem.

Maternal morbidity remains a significant problem in the US, affecting 15-20% of all deliveries. Furthermore, there are significant disparities in maternal morbidity by patient race.

Maternal morbidity is associated with labor induction and cesarean delivery.

Our group developed a calculator to predict individualized likelihood of cesarean delivery for patients undergoing labor induction, currently accessible on a Penn-sponsored website [[A validated calculator to estimate risk of cesarean after an induction of labor with an unfavorable cervix - PubMed (nih.gov)](https://pubmed.ncbi.nlm.nih.gov/29224730/)].

In a pre- and post-intervention study, utilization of this calculator during care at the Hospital of the University of Pennsylvania for eligible women was associated with significant reductions in maternal morbidity and cesarean delivery, as well as a reduction in racial disparities in birth satisfaction [[Maternal Morbidity and Birth Satisfaction After Implementation of a Validated Calculator to Predict Cesarean Delivery During Labor Induction - PubMed (nih.gov)](https://pubmed.ncbi.nlm.nih.gov/33185679/); [Standardized Cesarean Risk Counseling with Induction: Impact on Racial Disparities in Birth Satisfaction - PubMed (nih.gov)](https://pubmed.ncbi.nlm.nih.gov/34784614/)].

In a qualitative study evaluating the clinician perspective on the cesarean risk calculator, one of the biggest barriers to calculator utilization that emerged was the need for the clinician to recognize an eligible patient, go to an external website, and enter the patient’s information in order to obtain the patient’s individualized cesarean risk [[Implementation of a calculator to predict cesarean delivery during labor induction: a qualitative evaluation of the clinician perspective - PubMed (nih.gov)](https://pubmed.ncbi.nlm.nih.gov/33493705/)].

While the cesarean risk calculator continues to be used intermittently at HUP, it is not at all used at other Penn labor and delivery sites, such as Pennsylvania Hospital. There is significant room for improvement in calculator utilization in order to reduce maternal morbidity and cesarean rate for women undergoing induction of labor.

1. Who is involved in and impacted by this problem?

Clinicians caring for patients admitted for labor induction with term (>37 weeks gestation), singleton gestations with intact membranes and unfavorable cervices without a prior cesarean delivery

1. Where in the workflow does this problem occur?

At the time of labor induction and when deciding whether to proceed with vaginal birth or a cesarean delivery

1. What (if any) efforts or initiatives have already been implemented to address the problem? What impact did they have? Were there any key lessons learned?

During the initial pre and post-implementation study evaluating the impact of the cesarean risk calculator, a study coordinator or PI notified the clinical staff when the calculator was not used for an eligible patient. This method was time and resource intensive, and demonstrated that the acuity and volume of labor floor makes it difficult for clinicians to incorporate and remember to use even effective tools in practice.

1. What are the challenges to implementing solutions for this problem?

Importantly, the barriers to utilization of the cesarean risk calculator are known through rigorous qualitative study. They include the need for clinicians to recognize an eligible patient on admission, and then go to an outside website to enter the patient’s information and obtain that patient’s cesarean risk. As labor and delivery is a high volume and acuity setting, this can be easy for clinicians to miss.

**Implementation and Evaluation**

1. Describe your proposed solution(s) for overcoming the problem.

We envision this nudge to alert OBGYN and family medicine clinicians if their patient is eligible for calculator use and do the risk calculation using discrete variables in EPIC.

Eligibility criteria for calculator use include: >37 weeks gestation, singleton (ie not twins, etc), does not have a prior CS, does not already have ruptured membranes, is being induced

1. Where would you like to conduct this project? Please be specific. Include all division(s), department(s), practice(s), hospital(s), floor(s), or unit(s) where you would like to conduct this project.

HUP and PAH labor and delivery units

1. Where and when in the workflow would a nudge be most effective to prompt the right behavior?

When admitting an eligible patient to L&D

1. How will you measure improvement? Please provide your proposed primary and secondary outcomes and how they might be collected.

Currently, utilization of the cesarean risk calculator is measured by use of a standardized dotphrase in the electronic health record indicating the patient’s cesarean risk. The numerator is the number of patients with this dotphrase included in their documentation. The denominator is all patients who deliver at our sites who met eligibility criteria for the cesarean risk calculator.

The primary outcome of this nudge would be to improve the percentage of eligible patients for whom an individualized cesarean risk is obtained. Secondarily, we could look at outcomes known to be impacted by calculator use including maternal morbidity, cesarean rate, and birth satisfaction both overall and stratified by race.

1. List and explain any partnerships that will be needed to complete this project.

PennChart EPIC team for nudge and calculation

**Proposed Impact**

1. Do you foresee this project resulting in measurable improvement in any of the following areas? Select all that apply.

☐ Transforming care

☑︎ Efficiency and automation

☐ Wellness and engagement

☑︎ Health equity

☐ Population health

1. Briefly explain or estimate the potential measurable improvement in [field selected above].

Efficiency and automation: This nudge will automate eligibility screening and risk calculation, removing key barriers including remembering to recognize an eligible patient, going to an outside website for calculator use, and remembering to document calculator use.

Health equity: There are significant disparities in maternal morbidity by patient race. In a pre- and post-intervention study, utilization of this calculator during care at the Hospital of the University of Pennsylvania for eligible women was associated with a reduction in racial disparities in birth satisfaction

1. Describe or estimate the potential measurable impact on providers, patients, and finances for Penn Medicine.

Approximately 2000 patients meet criteria for the calculator across the 2 sites (HUP and PAH) each year; likely <40% are currently receiving the benefit of the cesarean risk calculator.

Using our data, successful calculator implementation will prevent 125 significant maternal morbidities in our system each year.

1. Please describe your vision for this project at scale.

After piloting the nudge with HUP and PAH, the nudge can be applied to other Penn Medicine locations (e.g., Princeton and Chester).

**Stakeholders and Approvals**

1. Who are the key stakeholders that need to be engaged in order to complete this project? Please provide the following details for each stakeholder: Name, Email, Title, Level of Engagement (Not Yet Engaged, Working to Engage, Engaged and Supportive)

Stakeholders involved would be all members of the department of obstetrics & gynecology. Physicians, midwives, and nurses make up the clinicians who would see this alert. As multidisciplinary buy-in from clinicians, leadership, and administration was already obtained for implementing the calculator into routine care, engagement is already high among this group who would be responsible for approving the nudge.

Engaged and supportive:

* Elizabeth Howell, [Penn email], OBGYN dept chair for UPHS
* Abigail Wolf, [Penn email], PAH OBGYN chair
* Sindhu Srinivas, [Penn email], Vice Chair of Quality for OBGYN, head of women's health service line
* Adi Hirshberg, [Penn email], Director of HUP L&D, Chair of OBQI at HUP
* Stephanie Ewing, [Penn email], Director of PAH L&D
* Elizabeth Quigley, [Penn email], PAH nursing leader for women's health
* I am also chair of OBQI at PAH and have discussed it there