ASPIRE Collaborative Meeting
July 16, 2021, 9:00am-12:10pm

I. MPOG Business and Updates
   A. CME and meeting notes available on the MPOG website under Events/News
   B. ACQR Retreat: September 17, 2021 at DoubleTree in Ann Arbor (Virtual TBD)
   C. MPOG Retreat: October 8, 2021 at the Manchester Grand Hyatt, San Diego, CA
   D. Healthy Behavior Optimization for Michigan (HBOM)
      1. New CQI led by Tammy Chang, MD, MPH, MS with goals to:
         a) Improve healthy behaviors in Michigan by ensuring access to effective and innovative programs that make the healthy choice the easy choice
         b) Vision to make healthy behaviors achievable and sustainable for all in the state of Michigan
         c) Plan to intervene during teachable moments in healthcare by partnering with other CQIs like ASPIRE
         d) First goal is to support CQIs to facilitate smoking cessation efforts with their partnering hospitals and POs
            (1) Will identify and disseminate low burden smoking cessation tools for patients and providers
            (2) Will provide guidance on data collection and program assessment
         e) Thoughts from ASPIRE Coordinating Center:
            (1) Can work with HBOM to understand how anesthesiologists and CRNAs can play a role to promote smoking cessation during our 'teachable moments' before surgery when patients may be interested in changing behavior
            (2) HBOM can act as partners, reviewing data in the MPOG registry to understand the opportunities across the state of MI
            (3) Based on this knowledge and approval from Michigan ASPIRE Quality Champions, we can create QI initiatives and tools to help anesthesia providers incorporate smoking cessation efforts with their patients
         f) Next Steps:
            (1) Obtain feedback and approval to move forward with MPOG data analysis
            (2) Create a dataset for HBOM colleagues to access within the MPOG firewalls
            (3) Develop a proposal for ASPIRE MI Quality Champions to respond to
   E. Preoperative Testing Optimization
      1. Michigan Value Collaborative (MVC) has identified preop testing as an opportunity for optimization
      2. Contacted ASPIRE Coordinating Center to gauge interest in partnering with them on a QI initiative to reduce unnecessary testing (see PPT slides for graph displaying variability across procedures and tests at participating MVC hospitals)
      3. Discussion:
         a) Is this an area of interest for ASPIRE Quality Champions?

b) What is the role of the anesthesia provider in determining testing at your facility?
c) What is the best way to work with MVC? Obtain testing metrics and benchmarking from MVC or generate using MPOG data?

II. Reflections and Lessons Learned on Quality Improvement
A. Henry Ford Allegiance, Holly Lockwood, RN, BSN, MBA
1. TEMP-02 was site selected measures and saw improvement from 88% - 92%
2. Posted TMEP-02 info poster in break room and hallway as a visual reminder to staff
3. Discussion
a) Nirav - There is an outcome temperature measure TEMP-03, have you looked at performance for that measure to observe correlation between TEMP-02 and TEMP-03
b) Holly - Yes, have discussed with PACU nurses and discussed how to improve documentation. We are also segwaying into SSI rate improvement so these measures tie in well to that.

B. Henry Ford Macomb, Jimmy Boutin, MD
1. Atmospheric lifetime and global warming potential of anesthetic vapors (see slides). Strictly using Sevoflurane as Desflurane has been phased out at Henry Ford Macomb.
2. Current performance for SUS-01 is 60%.
3. Newer absorbents with no KOH and low NaOH do not produce compound A At Henry Ford Wyandotte the Co2 absorbent has no KOH and less than 4% NaOH (recommendation from the Anesthesia Patient Safety Foundation Newsletter)
4. Looked at the flow rates for the first 5 minutes (as flows are often higher during induction) across 10 different cases. It was noted that flow rates after induction were remaining high after induction while patients were positioned etc.
5. Plan to discuss with staff more efficient ways to get to target concentration of sevoflurane. Focus on using the default flow rate of 6 at the start of the case so that maintenance can be achieved at 1L/min
6. Feldman & Hendrickx (2018) analyzed the time to reach a target concentration (2 MAC = 4%) at variable FGF rates (0.5 L/min, 1 L/min, & 3 L/min) and vaporizer set at 6%
a) Appears that in 2 mins at a FGF rate of 3 L/min the inspired concentration is close to reaching the target.
b) A FGF rate of 1 L/min takes approximately 8 mins
7. Tips for improving SUS-01
a) When fresh gas flow exceeds the patient's requirement, gases and vapors will enter the scavenging system and into the atmosphere
b) Minimizing the total fresh gas flow limits the environmental impact of volatile agents
c) Strategies to mange fresh gas flow
d) Turn off the fresh gas flow, not the vaporizer, during intubation
e) Minimize fresh gas flow during maintenance
f) Set the vaporizer to deliver a concentration greater than intended
8. Discussion

a) Thomas Leyden (BCBSM- via chat)- Nirav/Sachin, very interesting and important work. Curious if this work is primarily being limited to MPOG participants or is this also being addressed nationally by ASA?
b) Nirav (ASPIRE Director)- There are many at ASA that are interested in this topic and advocating but am unsure if there are other national metrics
c) Sachin (MPOG Research Director)- This is a deeply physiologic measure. Providence health group has done a lot of work on this but is not a part of the AQI measure list but can definitely reach out.
d) Mike Mathis (MPOG Associate Research Director) - Here is relevant link to folks at ASA working on this: https://www.asahq.org/about-asa/governance-and-committees/asa-committees/committee-on-equipment-and-facilities/environmental-sustainability/greening-the-operating-room
e) Sachin (MPOG Research Director) - Are you finding that most of the failures are in the first 5 minutes then? Is it limited to the beginning of the case for the most part?
f) Jimmy Boutin (Henry Ford Wyandotte) - When providers have high flow rates for the first 10 minutes we are finding they can't make up for that time throughout the procedure. I plan to focus on discussions of lowering flow rates during maintenance as well
g) Aisha Qazi (Beaumont Troy- via chat): At our site, one of the main cases we fail at is bronchoscopies where we use LMAs and requires higher flows. Could cases where high flows are necessary to obtain adequate tidal volumes be excluded?
h) Douglas Colquhoun (MPOG/Michigan Medicine) -Would love to chat about exclusions around airway cases with large leaks
i) Nirav Shah (ASPIRE Director)- there are some challenges teasing out cases with CPT codes
j) John LaGorio (Mercy Muskegon)- The ASA does have a group that works on environmental factors in regards to anesthesia care and equipment/facilities. I would encourage people to go to the ASA website to get more information on this.

C. Henry Ford Wyandotte, Merajuddin Khan, MD
1. Focus measure for QI: GLU-03
2. Have seen early success in cardiac procedures by controlling glucose.
3. Keeping sugar between 150-200 for all surgical patients do better postoperatively.
4. Majority of our failures for this measure are inpatients who receive insulin within a few hours on the floor they want to check it within 90 min and at that time they are intraop
5. Our site is below the benchmark because providers are not checking glucose within 90 minutes and not giving insulin to avoid hypoglycemia.
6. What we have done so far:
    a) Educated anesthesia providers on glucose measures (June '21)
    b) Educated Pre and Postop staff on glucose measures (May '21)
    c) Added time glucose was taken to pre-op handoff sheet

d) Analyzed ASPIRE data and counseled all providers who are not passing this measure

7. Next Steps
    a) Glucose BPA in Epic, Including a reminder to treat or recheck glucose
    b) Health system working on revising Tier 1 glucose policy
    c) Continue to analyze ASPIRE data and counsel all providers who are not passing this measure
8. Challenging measure but very important because impacts morbidity and mortality. The
9. Discussion
    a) Nirav (ASPIRE Director) - GLU-03 is an earlier ASPIRE measure. There is variability among this group in terms of time frame however, the QI champions made expert consensus on what was a reasonable time frame which is where the 90 minute threshold originated from
    b) Josh Berris (Farmington Hills via chat) - 2 hours please... as I have always said. 2 hours is what we do here because Humalog is not supposed to be dosed more frequently than that. It is not conducive to workflow to test at 2 hours so I can redose, but test also at 90 minutes just to satisfy the measure.
    c) Dan Applefield (St. Joseph- Oakland) - are people failing the measure because of the time constraint or other reason?
    d) Nirav (ASPIRE Director) - We plan to discuss this during the performance review session (see notes below).
        (1) EPIC BPA - we have worked with the Epic team to ensure they are specific with which BPAs to make available for anyone participating in MPOG or not.
    e) Dennis Ahmad (Metro Health) - We created custom epic intra-op reminders q2 hrs for glucose checks
    f) Jill Mhyre - This is an important equity measure at UAMS. Are other sites finding differential pass rates based on patient race?
    g) Meraj Khan (HFHS Macomb) - Outpatient cases are easier to manage and see more failures with Inpatients since they have received insulin or other glucose management on the unit prior to transfer to preop.We also see failures in the PACU when the Anesthesia provider signs out before checking glucose before patient goes back to the floor or discharged home.
    h) John Trummel (Dartmouth-Hitchcock) - We have created an EPIC BPA and I am not sure how much it helps. There may be some BPQA fatigue.
    i) Nirav Shah (ASPIRE Director): Thanks for these comments. Looking forward to more conversation later during the performance review session. We may need to revisit these glucose measures or at least the time period of 90 minutes.

III. Postpartum Hemorrhage: Diagnosis, Treatment, and the Michigan Approach- Tom Klumpner, MD

A. Maternal mortality has decreased in the developed world over the last 25 years, however it has increased in the US over the last few decades
    1. This alarming trend has gained national attention. Many news corporations in the US are investigating this crisis and USA Today asserts

that the United States is now the most dangerous place to give birth in the developed world.

B. According to the CDC, postpartum hemorrhage is a leading cause of maternal death. Death from PPH is often preventable
    1. Often related to delayed response to clinical warning signs and ineffective care
    2. In a review of pregnancy-related deaths (from 2002-2005), the California Pregnancy-Associated Mortality Review Committee found that 70% of deaths due to obstetric hemorrhage had a "good-to-strong" chance of being prevented.
    3. We are now at a turning point in maternal care. We must re-evaluate our approach to common obstetric conditions like postpartum hemorrhage, where we may be able to have an impact. And, I think this effort starts with making sure that we have a solid fundamental understanding of the disease.

C. Incidence
    1. According to National Inpatient Sample data from 2012-2013, the incidence of postpartum hemorrhage in the U.S. is approximately 3%.
    2. Worldwide, the incidence is 6-11%
    3. The incidence is increasing
        a) 26% increase in the US between 1994-2006
        b) Severity is also increasing
        c) This may be due in part to better reporting, but may also be related to an increase in comorbidities that increase risk of hemorrhage, such as obesity and advanced age, in the maternal population.

D. Risk factors
    1. Before pregnancy
        a) Maternal Age <19
        b) Maternal Age >35
        c) Grand Multiparity (>= 5 births)
        d) Prior cesarean delivery
    2. Antepartum
        a) Hypterensive diseases of pregnancy
        b) Diabetes
        c) Polyhydramnios
        d) Infection
        e) Placenta previa/abruption
        f) Multiple Gestation
        g) Macrosomia (>4,000g)
        h) Fibroids
    3. Intra/Post-Partum
        a) Medical Induction of Labor
        b) Instrumental Vaginal Delivery
        c) Cesarean Delivery
    4. Not all risk factors are equal. A retrospective study by Kramer et al (2013) evaluated 8.5 million deliveries in the National Inpatient Sample to

identify diagnoses (identified by ICD codes) that were associated with severe postpartum hemorrhage.

a) M.S. Kramer, C. Berg, H. Abenhaim, et al. Incidence, risk factors, and temporal trends in severe postpartum hemorrhage. Am J Obstet Gynecol, 209 (2013), pp. 449.e1-449.e7

5. Risk factors are not completely predictive
    a) 40% of PPH occurs in low risk women

E. Definition
1. Traditionally - 500ml in vaginal delivery, 100ml in cesarean dleivery
2. Now defined as 1000mL blood lost or blood loss accompanied by signs or symptoms of hypovolemia
3. The goal is to encourage intervention for postpartum hemorrhage if signs of hypovolemia are present, even in the absence of a set threshold for estimated blood loss
4. Recent and more robust studies demonstrate a great variability in measured blood loss that range from <150 mL to almost 700 mL for uncomplicated vaginal delivery.
5. Moreover, set blood loss thresholds may not adequately represent risk of poor outcome. Many women will lose >500 mL without any clinical consequence, and depending on maternal comorbidities some will bleed less and will still be at risk of adverse outcome.
6. And, the separate thresholds for vaginal delivery and cesarean delivery are confusing: why would a blood loss of 500 mL represent a risk for women after vaginal delivery but not for a cesarean delivery?
7. Visual estimation of blood loss
    a) Most frequently practiced
    b) Most people receive no formal training in estimating EBL
    c) Training might not improve estimation
    d) Often underestimates blood loss
    e) Underestimation increases as blood loss increases
8. Quantitative methods now supported by PPH bundles:
    a) More sensitive
    b) Not always rapidly available

F. Diagnosis
1. Signs of symptoms of hypovolemia with blood loss
    a) Increased blood volume in pregnancy limits sensitivity -The physiological increase in circulating blood volume during pregnancy means that the signs of hypovolemic shock become less sensitive in pregnancy, and often, signs of hypovolemic shock are a late finding in severe obstetric hemorrhage.
    b) Clinical signs of >1000-1500cc loss (from the Royal College of Obstetricians and Gynecologists):
        (1) Tachycardia
        (2) Tachypnea
        (3) Slight decrease in SBP
    c) Clinical signs of >1500cc loss:

(1) Increased tachycardia
(2) Increased tachypnea
(3) SBP <80
(4) Altered mental status

2. Early recognition is key
    a) A healthy pregnant person must lose a significant amount of blood before clinical signs of hypovolemia are recognized
3. The Maternal Early Warning Criteria
    a) Understanding the importance of early recognition of vital sign abnormalities in the identification and management of postpartum hemorrhage and other maternal morbidity, the National Partnership for Maternal Safety has encouraged institutions to adopt early warning systems
    b) These maternal early warning systems include vital sign thresholds, such as a heart rate greater than 120, or a systolic blood pressure less than 90 mmHg that should prompt a physician evaluation.
    c) Criteria
        (1) Systolic BP <90 or >160
        (2) Diastolic BP >100
        (3) Heart rate <50 or >120
        (4) Respiratory Rate <10 or >30
        (5) Oxygen saturation on room air, at sea level <95%
        (6) Oliguria <35mL/hr for >= 2 hours
        (7) Maternal agitation, confusion, unresponsiveness; PAtient with preeclampsia reporting a non-remitting headache or shortness of breath

G. Pathogenesis - the 4 Ts: Tone, Trauma, Tissue, Thrombin
    1. Tone - Uterine atony: overdistension, muscle fatigue, GA, chorioamnionitis
        a) While a broad differential is important, uterine atony is most often the cause of postpartum hemorrhage (80%)
    2. Trauma - Genital tract laceration, uterine inversion, surgical misadventure
    3. Tissue - retained placenta, invasive placenta, placental abruption
    4. Thrombin - placental abruption, pre-elcampsia, coagulopathy
H. Treatment
    1. EBL >1000mL, brisk bleeding or signs of hypovolemia -> resuscitate and determine cause and treat
    2. Resuscitation
        a) Call for help
        b) Establish (multiple) large-bore IV access
        c) Obtain baseline laboratory studies: CBC, INR, fibrinogen, viscoelastometric testing (if available)
        d) Type and Screen/Type and Cross - contact the blood bank early on
        e) Correct hypovolemia - IV fluids opened to gravity
        f) Escalate monitoring
        g) Monitor urine output

h) Move to the OR quickly
i) Maintain normothermia, electrolyte management, etc

3. Determine cause and treat - while resuscitation occurs, consideration must be given to the cause of the hemorrhage and appropriate steps must be taken to control the bleeding
    a) Cause: Tone
        (1) Remember that uterine atony is the cause of 80% of postpartum hemorrhage.
        (2) Uterotonics are routinely administered. Choice of uterotonic agent is based on clinical preference and contraindication.
            (a) Evidence supporting the use of a specific uterotonic agent to supplement oxytocin is lacking.
            (b) Oxytocin is our first line uterotonic. Our OBs are usually quick to move to secondary uterotonics as needed. Methylergonovine should be used judiciously in patients with hypertension and remember that carboprost can cause bronchospasm, so reactive airway disease is a relative contraindication.
        (3) Uterine massage
        (4) Intrauterine balloon tamponade
        (5) Uterine compression sutures - at MM uterine compression sutures are uncommonly performed during a cesarean delivery to control post-delivery bleeding due to uterine atony
    b) Cause: trauma/tissue
        (1) Evaluation by obstetric team
        (2) Laceration repair
        (3) Uterine exploration
        (4) Manual removal of placenta
        (5) Curettage
    c) Cause: Thombin
        (1) Evaluation of clotting
        (2) Replace clotting factors, platelet
        (3) Hematology consult for congenital clotting disorders to target treatment - ideally done prior to admission to labor and delivery
        (4) We typically send coagulation studies, including POC viscoelastic testing and CBC
        (5) Coagulopathy may be an early finding in postpartum hemorrhage and certainly as the severity of hemorrhage increases, close attention must be paid to the coagulation system

I. Transfusion management
    1. The ideal transfusion strategy during obstetric hemorrhage is unknown. pRBC: FFP - fixed ratio? 1:1?

2. In line with the 2017 ACOG Practice Bulletin on Postpartum hemorrhage, a recent survey study published in 2017, found that more than 80% of institutions responding using a fixed RBC:FFP ratio of 1:1 in their massive transfusion protocol. Emerging evidence demonstrates that a different approach may reduce unnecessary transfusions.
3. Hypofibrinogenemia is associated with postpartum hemmorrhage.
    a) Hypofibrinogenemia is often the first coagulation defect seen in obstetric hemorrhage.
    b) Hypofibrinogenemia is also an independent predictor of progression of the hemorrhage
    c) Early hypofibrinogenemia is associated with final blood loss in excess of 2.5L, an increased risk of fall in hemoglobin >4g/L or administration >= 4 units of pRBCs. Early hypofibrinogenemia is also associated with need for an invasive procedures, such as selective arterial embolization or hysterectomy, to control bleeding.
    d) This has led many to believe that fibrinogen is an important therapeutic target in PPH.
    e) The severity of hypofibrinogenemia is also dependent on the etiology of the hemorrhage.
    f) For example, placental abruption and amniotic fluid embolism are associated with early profound hypofibrinogenemia. Whereas hemorrhage due to uterine atony does not cause near as profound a decrease in fibrinogen (at least early in the hemorrhage).
    g) While hypofibrinogenemia characterizes severe obstetric hemorrhage, early empiric administration of FFP as part of a 1:1 transfusion strategy may actually dilute plasma fibrinogen.
    h) A normal fibrinogen level in the third trimester of pregnancy is 373-619 mg/dL.
    i) FFP contains about 200-250mg/dL fibrinogen.
    j) While empiric FFP may increase fibrinogen levels in the setting of profound hypofibrinogenemia caused by placental abruption.
    k) Because fibrinogen is normally high at term, empiric administration of FFP in other common causes of PPH may actually decrease plasma fibrinogen level
    l) So, empiric administration of FFP as part of a 1:1 transfusion strategy make actually decrease a patient's fibrinogen level in the majority of postpartum hemorrhages.
    m) As a consequence, some centers have moved toward viscoelatometric testing to guide transfusion therapy.

J. Using Viscoelastometric Testing to Guide Transfusion Therapy
    1. Viscoelastometric tests, such as the ROTEM or TEG systems, provide a point-of-care qualitative assessment of clotting function. In many cases,

an assessment of clotting function can be obtained in 5-10 minutes.

2. The ROTEM system (rotational thromboelastometry) uses a cylindrical pin immersed in a cuvette of patient blood that is then oscilated to the left and right. The pin encounters resistance as a clot begins to form. Eventually lysis of the clot causes resistance on the pin to decrease.
3. A graph of this resistance produces characteristic plots that are useful for determining clotting function.
4. Various reagents can be added to the cuvettes of patient blood to isolate the contributory effects of various aspects of the clotting cascade.
5. Of particular use in obstetric hemorrhage are the tests that evaluate the intrinsic and extrinsic systems as well as the contribution of fibrinogen to clotting firmness
6. For example, the Rotational Thromboelastometry (or ROTEM) machine provides an INTEM, EXTEM and FIBTEM result that provide an assessment of the intrinsic system, extrinsic system and evaluation of fibrinogen contribution to clot firmness.
7. While ROTEM is used at the University of Michigan, this is not an endorsement of any one particular viscoelastic testing method.
8. Viscoelastic point of care assessments of the fibrinogen contribution to clot firmness, such as the FIBTEM A5 test correlate with severity of PPH, and correlate with fibrinogen concentration.
9. (As Collins demonstrates, as the severity of postpartum hemorrhage increases, hypofibrinogenemia worsens. The FIBTEM A5 result also decreases as the severity of hemorrhage increases.)
10. Based on the fact that hypofibrinogenemia and FIBTEM value are associated with severity of postpartum hemorrhage, I think an important question is whether restoring fibrinogen level to pre-hemorrhage levels based on point of care testing results will decrease blood transfusion.
11. In the OBS2 study, 55 women with hemorrhage of 1000-1500cc, ongoing bleeding and a FIBTEM level < 16mm (which correlates to a fibrinogen level of about 300mg/dL) were randomized to receive a dose of fibrinogen adjusted based on patient weight and FIBTEM A5 value at time of randomization. The goal was to raise a patient's fibrinogen level to the level closer to term.
12. There was no difference in the number of units of blood products transfused in those who received fibrinogen concentrate or placebo.
13. In subgroup analysis, the authors also found no difference in outcomes in those women who had been randomized to placebo or treatment with a FIBTEM A5 between 12 and 16 mm. A FIBTEM A5 of 12mm correlates to a fibrinogen level of about 200mg/dL. … leading the authors to conclude that perhaps there is little benefit to treating a fibrinogen level in excess of 200mg/dL.
14. Therefore, it appears as if the raised fibrinogen at term is a physiologic buffer rather than something required for hemostasis.

15. What if a lower fibrinogen threshold of 200mg/dL or FIBTEM A5 of < 12 mm is used to trigger administration of fibrinogen concentrate?
16. This was a prospective observational study at a single hospital in the UK evaluating the effect of an updated maternal massive hemorrhage protocol
17. Patients were included if they had massive hemorrhage defined by EBL > 1500cc with evidence of coagulopathy, as determined by ROTEM findings (FIBTEM A5 < 12mm, indicative of a plasma fibrinogen level of 2 $g.l^{-1}$)
18. Patients receiving anticoagulant therapy were excluded.
19. The initial "shock pack" PPH protocol emphasized early treatment with transfusion for PPH while formal laboratory studies and point of care studies (including ROTEM) were pending.
20. The revised, "fibrinogen" PPH protocol instead emphasized ROTEM-guided transfusions with use of fibrinogen concentrate in place of cryoprecipitate.
21. The ROTEM-guided PPH protocol resulted in fewer administrations of blood products.
22. Not surprisingly, there were fewer administrations of cryoprecipitate, but there were also fewer administrations of FFP and platelets.
23. And, while the study was underpowered to detect major differences in complications, there were fewer cases of transfusion-associated circulatory overload with the ROTEM-guided transfusion protocol
24. Interestingly, there were fewer hysterectomies in the ROTEM-guided transfusion group, however this may have been due to chance.
25. What about using ROTEM to evaluate other aspects of clotting function?
26. In this retrospective cohort study at Yale-New Haven Hospital, these investigators evaluated the effect of introducing ROTEM-guided assessments of clotting function in their massive hemorrhage protocol between 2011 and 2015.
27. The ROTEM point of care testing protocol was introduced in 2014. The new testing protocol included a structured didactic course, a hands-on-session, skills testing and certification.
28. (The protocol was used for severe hemorrhage, which was defined as 1500cc.)
29. These investigators included set thresholds on the ROTEM to guide administration of cryoprecipitate (using the FIBTEM value), FFP (using the clotting time) and platelets (using the maximum clotting firmness)
30. After introduction of the ROTEM-guided massive transfusion protocol, the authors found a significant reduction in the number of pRBC, FFP and platelet transfusions. The authors also found a decrease in the length of stay, the number of ICU admissions and the number of hysterectomies.
31. All of this translated to a total reduction in hospitalization costs.

K. Tranexamic Acid
    1. Early activation of fibrinolytic pathways appears to be a characteristic of

traumatic hemorrhage.

2. The WOMAN trial, was a randomized controlled trial between 2010 and 2016
3. It included 193 hospitals in 21 countries and a little over 20,000 women were randomized to either 1g of tranexamic acid vs. placebo at the first clinical diagnosis of hemorrhage
4. In women given tranexamic acid within three hours of delivery, a reduction in death due to bleeding was seen without an increase in thrombotic or other adverse events
5. However, mortality rates in both treatment groups were very high, which makes it difficult to generalize this study to developed countries.
6. As a comparison, the mortality rate in the US from postpartum hemorrhage is 1.7 per 100,000. This is a 1,000 fold difference in mortality.
7. Nonetheless, tranexamic acid is being included on many PPH protocols, including the protocol in use at the University of Michigan.

L. The Michigan Medicine PPH Transfusion Protocol

1. I think the evidence now definitively demonstrates that using some point of care testing method to guide transfusion during postpartum hemorrhage will decrease the total number of blood products transfused. Using POC testing may also decrease length of hospital stay, ICU admissions, number of hysterectomies and total hospitalization costs. Finally, tranexamic acid may prevent death from PPH, but the NNT in developed countries is likely high
2. These studies therefore form the basis of the postpartum hemorrhage transfusion protocol we use at the University of Michigan.
3. When a hemorrhage is diagnosed or suspected, several labs are sent automatically, including a ROTEM
4. We make an initial assessment of the patient's fibrinogen level and administer fibrinogen concentrate based on viscoelastometric testing.
5. Tranexamic acid is given early in the hemorrhage.
6. Administration of FFP and platelets are also guided by viscoelastic testing results. These thresholds for EXTEM A10 and EXTEM CT are similar to those at other institutions where ROTEM guided transfusion therapy is used for PPH. (Yale New Haven Hospital)
    a) (A retrospective before and after study at this hospital found that using similar thresholds in a ROTEM guided PPH transfusion strategy resulted in fewer blood product transfusions, lower estimated blood loss, lower rate of hysterectomy, ICU stay and total hospital costs)
    b) Snegovskikh, D. et. al. Point-of-care viscoelastic testing improves the outcome of pregnancies complicated by severe postpartum hemorrhage. Journal of Clinical Anesthesia 44 (2018) 50–56.

M. Preparation and Response

1. Maternal Early Warning System: National Partnership for Maternal Safety has encouraged hospitals to adopt Maternal Early Warning Systems to improve response and treatment of PPH
2. Maternal Early Warning Criteria:
    a) Systolic BP <90 or >160
    b) Diastolic BP >100
    c) Heart Rate < 50 or >120bpm
    d) Resp Rate <10 or >30
    e) O2 Sat on RA: <95%
    f) Oliguria ml/hr for >/=2 hours <35
    g) Maternal agitation, confusion, or unresponsiveness; patient with preeclampsia reporting a non-remitting headache or SOB
3. Maternal Early Warning System Cycle:
    a) Monitor
    b) Identify Trigger
    c) Alert
    d) Evaluate
    e) Diagnose
    f) Respond and repeat
4. University of Michigan has implemented AlertWatch (computer software tool) to assist with recognizing physiologic deterioration in L&D
5. Simulation and drills practicing detection and response of PPH is needed to improve maternal outcomes (see slides for studies to support simulation and impact on outcomes)
6. Resources for PPH management:
    a) Use of a postpartum hemorrhage management protocol is recommended by ACOG
        (1) UM PPH protocol shared- see PPT slides
        (2) Council of Patient Safety in Women's Health Care
        (3) Society for Obstetric Anesthesia and Perinatology (SOAP)
        (4) American College of Obstetricians and Gynecologists (ACOG)

N. Quality Measures:
1. Few quality measures for anesthesiologists in this space
    a) Some aspects of PPH can be difficult to concretely measure
    b) Some aspects of PPH care are outside the domain of anesthesiology
2. However, anesthesia team involvement in multidisciplinary QI projects is important
3. Consider measuring maintenance of normothermia or tx of electrolyte derangements
4. Look forward to hearing more about this from the MPOG OB Subcommittee

O. Conclusion:
1. Maternal mortality in the US is rising, while it is decreasing in other developed countries.
2. Improving our response to PPH may reverse this trend.
3. Early identification of PPH is important.
4. Get involved early.
5. Quickly escalate care.
6. Consider viscoelastic testing/send labs early.

7. PPH protocols improve outcomes.

IV. Obstetrics Panel
   A. OB Panel moderated by Nirav Shah, MD (ASPIRE Director)
   B. Members of panel:
      1. Angel Martino-Horrall, MD (OB Regional Medical Director, Beaumont Health System, Northstar Anesthesia)
      2. Josh Younger, MD (Henry Ford-Detroit)
      3. Tom Klumpner, MD (Michigan Medicine)
   C. Nirav Shah (ASPIRE Director): **The coordination of many resources that require fast mobilization presents challenges at large hospitals and small hospitals, Angel, since you've been at both, what differences or barriers did you encounter in setting up these resources that require 24-7 coverage with hospitals of different sizes and infrastructures?**
      1. Angel Martino-Horrall (Northstar/Beaumont Health System): I think that one of the biggest things is the smallest thing: provider communication., Doesn't matter the size- know the members of your team and how to get in contact with them regardless of time of day and setting up consistency is important. Trying to remove the barriers of 'we've always done it this way' is the hardest thing to do and exist at a small or large institution. At a smaller institution, it is sometimes easier to get in contact with people and a little bit easier to make changes as there are fewer staff to communicate with. Will take much longer to disseminate the information at a larger institution but then the impact is much larger as well.
      2. Josh Younger (HFHS): That hits the nail on the head! Cultural change on labor and delivery units can be hard as it's a melting pot of people with different backgrounds and experiences and it's important to create a positive culture to be able to effectively communicate. In crisis, it's necessary to have already built the collaboration beforehand so it all comes together when it's most needed.
      3. John Lagorio (Mercy Muskegon)- do you feel higher maternal mortality in the US compared to the world may be demographic related as opposed to care related? If so, how may we help recognize and address that?
         a) Tom: That's a loaded question. 49 states have seen an increase in maternal mortality in the last 30-40 years, but California has actually seen a decrease. Many systemic issues in the way we provide care in the US. Access to care can be an issue in the US and around the world but this is definitely a complex problem with several factors contributing.
      4. Jill Mhyre (UAMS) - We just opened a shared workroom with the obstetricians. Definitely a culture shock for some members of the team, but excited to break down barriers to communication. This was a 5 year effort which included the addition of a 3rd OR so we saw a big need for increased patient safety. It's a relatively big room with 10 computers with a large table in the center for medical students, residents etc. We have suffered communication gaps but I feel this is coming to an end now - when obstetricians are reviewing/discussing strips etc we are now all a part of that conversation. I don't have stories to share yet but I think it will definitely improve care and how decisions are made.
         a) Angel Martino-Horrall (Northstar/Beaumont Health System): Do you use this as a debrief space as well? It's hard to get the team back together after the procedure

b) Jill Myhre (UAMS)- Yes I think that's a good idea and is on our agenda. It's tricky to get anesthesia and surgical attendings present to mandate a debrief after incision closure. We do call nurses to the room when we are debriefing after a major event.

D. Nirav Shah: **How do you measure improvement around PPH? Are there metrics in this space? Or is this early stages and we're still trying to figure out what the appropriate process and outcome measures are?**
   1. Tom Klumpner (Michigan Medicine) - My impression is that this is a space that's evolving but that doesn't mean we shouldn't start measuring things. We should look at the data and discuss it as a collaborativelooking at practice patterns. At Michigan, we are looking at transfusion amounts per case and starting to examine practice patterns. Some obstetricians will say 'Oh, she's bleeding -give 2 units.' That seems like the first place to start as an opportunity to reduce unnecessary transfusions.
      a) Jill Mhyre (UAMS) - How do you operationalize that measure? Is it total of units of blood product?
         (1) Tom Klumpner (Michigan Medicine): Total units of red cells for any delivery. Also looking at a maternal hemorrhage cart. Another low-hanging fruit area. Are you doing an obstetric hemorrhage risk assessment? Do you have blood available?
         (2) Angel Martino-Horrall (Northstar/Beaumont Health System)- We have used our OB data analyst to get some of this information. I've also gotten a lot of information from our blood bank since they track what the lab values were and if those products were given: did we give them wisely? What was wasted? These were all learning points for us as OB anesthesiologists and then had a broader discussion with the obstetricians. Our blood bank would shut down blood transfers to other units once we called a PPH which gave us some necessary awareness.
         (3) Josh Younger (HFHS) - We see similar things at HFHS. We have analysts that actually pull out data and come through to refine it but we were able to look at this together and discuss how to make meaningful changes. There is room for people to redefine certain metrics and how we can best use EMRs to our benefit.
         (4) Nirav Shah (ASPIRE Director): Can work with Epic and other EMRs over time to see that the documentation and data is available to build these metrics
         (5) Josh Younger (HFHS): Could also look at AKI metrics and even examine those patients who maybe needed blood and didn't get it to prevent certain outcomes. Did we apply the appropriate interventions in trying to prevent AKI.

E. Nirav Shah (ASPIRE Director): **The lessons learned from PPH management and coordination are certainly applicable to other emergency situations, have any of you taken your systems applied to PPH management and adapted them for other emergency response or clinical situations?**
   1. Angel Martino-Horrall (Northstar/Beaumont Health System): During my time at Sparrow, after we implemented the PPH protocol, we developed an OB

emergency team that would be mobilized across the hospital for a variety of OB emergencies, not just PPH. But PPH led us to this decision. We also noticed that a lot of people showed up at a code and everyone didn't exactly have a role or know their role so we made lanyards to identify each person's role in the code which is what we did at other hospital codes and just applied to OB team emergency response team as a solution.

2. Josh Younger (HFHS) - What I've seen is where we use protocols it seems to bleed into other areas. The other thing is stakeholders. It's about communication and culture but also about relationships across the health system.
3. Sydney Brown (Michigan Medicine via chat): Has anyone used a checklist for hemorrhage? Both to be used prior to the OR, and in the OR? For instance, to be posted on a monitor for everyone in the room to reference
    a) Angel Martino-Horrall (Northstar/Beaumont Health System via chat): Yes Sydney- we use it at Beaumont. Ours is not posted on the wall. it's a clipboard. but I recently screen shot that exact idea of a board from Dr Nixon's soap presentation in the spring! she is in Chicago I think?! it looked like a great tool ….if we can find a space to hang it that is functional for viewing & writing on it at the same time?!

V. Performance Review Session

A. Process:

1. Pick measures that have some variability
2. Pick measures of timely interest
3. Describe measure to refresh memory
4. Ask sites to describe their workflow
5. What can the collaborative learn from you?
6. What can you learn from the collaborative?
7. What can we learn from each other?

B. **GLU 03- Treatment or recheck of hyperglycemia (BG>200): Preop-PACU**

1. Inclusion- All patients with glucose level greater than 200 mg/dL
2. Exclusion -
    a) ASA 5 and 6 cases
    b) Patients < 12 years of age.
    c) Glucose measurements > 200 mg/dL within 90 minutes before measure end (see 'Other Measure Build Details' for more information)
    d) Outpatient cases with Anesthesia Start to Anesthesia end time less than 4 hours long
    e) Obstetric Non-Operative Procedures (CPT: 01958)
    f) Labor Epidurals (as determined by the MPOG 'Obstetric Anesthesia Type' Phenotype results 'Labor Epidural' and 'Conversion (Labor Epidural Portion)')
    g) Cases where the 'Measure End Time' precedes 'Measure Start Time' will be excluded and marked 'invalid'
3. Success - Administration of insulin within 90 minutes (either IV or sub Q routes) or recheck of glucose level within 90 minutes
4. Performance shared with the group. There is a wide variation in performance for this measure. Some sites have very high performance, and we know those sites spend a lot of time working on glucose management. There is also high

variability on the low end as well. For many sites, the glucose measures have a low denominator which will affect performance. The actual difference between sites may not be as high when taking that into consideration as well.

5. Discussion:
    a) Do you have a perioperative hyperglycemia management protocol at your institution?
    b) If yes, what are lessons learned from implementing this protocol?
    c) If no, why no protocol? What are the barriers?
6. Feedback:
    a) Josh Berris (Beaumont Farmington) - At Farmington Hills we have a protocol we developed years ago and we order it for every DM patient. It is distinct from anything the rest of the hospital does.
    b) Alex Bowhouis (Holland) - I think it is a low denominator and a lot of times the glucose will come back in the low 200s and we will choose to ignore it, or we figure that it is a short case and we will have the postop nurse re-check it, and the follow up communication isn't done so it doesn't get rechecked in postop. It has to be a very high glucose for someone to want to check and treat given that many of our cases are very short. We also don't have glucometers in every room, so we have to call for a glucometer if we want to check intraop.
    c) Nirav Shah (Michigan Medicine/MPOG)- Dr. Khan's thought about having it as part of a handoff and time of last checked may be important. Is there a standard periop/institutional protocol that you use?
    d) Alex Bowhouis (Holland) - the reason why we have a protocol is because of ASPIRE, from about 2017. It is in line very close with ASPIRE and is for glucose >200. I often forget to tell the postop nurse that we gave the patient insulin and to ask that they recheck the sugar
    e) Josh Berris (Beaumont Farmington) - Our PreOp nurses are also really good at handing off to CRNAs when the recheck is due.
    f) Kathleen Collins (St. Mary's Livonia): Posted St. Mary's Livonia's perioperative glycemic protocol in the chat. Laminated copies posted in POHA, OR on machines, and PACU. Just as a reminder. (ASPIRE has this protocol saved if you'd like to view it, please contact the coordinating center: support@mpog.zendesk.com)
    g) Daniel Applefiled (St. Joseph Oakland) - We are also not hitting the bar. We have not focused on this measure as we are focusing more on P4P. We have a protocol in place for a number of years. The success we are showing is attributed to the preop nurses. They are very good about calling if the glucose is >180. They will contact us and ask if we are treating it and for an order. We have POC machines in our rooms. It is easy and we implement it into the handoff in PACU. It is part of the culture here, but we do have room for improvement. We also face challenges with having residents and teaching them about ASPIRE (the dashboard, establishing buy-in, teaching them about the measures).It is often hard to keep up with all the new measures so we try to focus in on the ones that we think we can improve and will have an impact in care. It really all comes down to preop nursing. Dr. Davies when he was here worked hard to get POC machines in all the rooms and in preop.

h) Pam Tyler (Beaumont Farmington/Troy)- The nurses in preop have it in their handoff to see if the sugar check is due within 90 minutes and if it can be checked again before going into the OR.
i) Brad Berndt (Bronson Kalamazoo) - As part of our ERAS protocols for specifically ortho, spine and OB, part of the protocol is that these patients are supposed to have a carbohydrate drink 3 hours before surgery. These patients are presenting to preop with elevated glucoses (ie 210 -220) even if they aren't diabetic. We have a protocol to recheck it if >200, but we have a lot of questions from providers on how to manage this.
j) Pam Tyler (Beaumont Farmington/Troy) - at some places for ERAS they will sub for G2 gatorade if diabetic instead of the carbohydrate drink.
k) Kim Finch (HF Detroit/WB) - What benefit does the G2 drink have if it isn't carb loading?
    (1) Pam Tyler (Beaumont Farmington Hills) - It is for providing them hydration without putting them into overload.
    (2) Kim Finch (Henry Ford Detroit and West Bloomfield) - The research says the carb loading drink is good for diabetics and non diabetics. We are moving towards testing all of our patients (regardless of diabetes status) in preop. We are finding some without diabetes that have elevated glucose.
    (3) Mike Mathis (Michigan Medicine/MPOG)- The definition of diabetes involves a glucose tolerance test. I am not sure how much the glucose load compares, but this may be a way to find out that these patients have pre-diabetes.
    (4) Allison Janda (Michigan Medicine/MPOG)- is anyone organizing follow-up for these patients for the ones that may have diabetes?
    (5) John LaGorio (Mercy Muskegon) - I will often let the patients know that they should follow up with PCP and let the surgeon know
    (6) Douglas Colquhoun (Michigan Medicine/MPOG)- This may actually change their postop management if we can get them set up prior to discharge
l) Sydney Brown (Michigan Medicine via chat): Are there instructions provided to patients about following up with their PMD about elevated glucoses in this setting?

C. **GLU 05 - Treatment of hyperglycemia (BG>200) within 90 minutes**
1. Similar to GLU 03 but only looks at treatment (not recheck)
2. Percentage of cases with a blood glucose >200 mg/dL with documentation of insulin treatment
3. Exclusions:
    a) ASA 5 and 6 cases
    b) Patients < 12 years of age
    c) Glucose measurements > 200 mg/dL within 90 minutes before measure end
    d) Outpatient cases with Anesthesia Start to Anesthesia end time less than 4 hours long

e) Labor Epidurals

4. Please note: documented blood glucose <200 within 90 minutes of a blood glucose >200 mg/dL prevents a flag
5. See bar graph comparing participating site performance in PPT slide. See similar variation across sites as compared to GLU 03- sites that perform well on GLU 03 also perform well on GLU 05. A lot of variability in performance for sites inside and outside the state of Michigan
6. Feedback:
    a) See notes from GLU 03 discussion.

D. **GLU 04 - Treatment or recheck of hypoglycemia (BG<60): Preop-PACU**

1. Performance shared with the group. Generally high performance across our institutions. Counter measure to aggressive hyperglycemia treatment.
2. Discussion - What is the process for reviewing and following up on these cases? Should this be a never event? Or are there cases where it is appropriate to have a GLU <60 without treatment or rechecking?
    a) Tim Dubovoy (Michigan Medicine) - We've had some adverse events that have had poor patient outcomes due to hypoglycemia. We don't have Centricity fully integrated with Epic which is what is used in preop/pacu which makes it difficult. At our institution, we decided this requires active intervention - if a patient has a BG< 60 the anesthesia provider will receive a notification page. It's difficult for providers to ignore an abnormal lab page sent directly to them. We also review all hypoglycemia on a monthly basis and make a determination if it should be categorized as a QA event. If the provider misses the time window but did the appropriate thing, we usually consider it a pass. If we don't see a response from the provider then we will 1) see if the alert was generated and 2) if appropriate treatment was given. We then have a conversation with the provider, not in a punitive way. This is something we constantly need to monitor and provide feedback to avoid unexpected events.
    b)

E. **BP 03 - Low MAP prevention (MAP < 65 for 15 minutes cumulative duration)**

1. Inclusions - All adult patients regardless of anesthetic technique
2. Exclusions - Baseline MAP < 65 mmHg, OB , Cardiac, Lung/Liver Transplant
3. Success: MAP < 65 mmHg that does not exceed cumulative time of 15 minutes
4. Performance scores shared with the group. Overall the performance across the collaborative is very good. There is some variation both within Michigan and across the country. This is also a P4P measure for this year. Do you have consensus within your practice on the management of hypotension? What is the vasopressor of choice in your institution? How do you manage hypotension in free flap cases?
5. Feedback:
    a) Aisha Qazi (Beaumont Troy) - The way that we try to avoid hypotension is through education with CRNAs and staff in terms of the guidelines and when we should consider treating. Once you have treated, to recheck the blood pressure so that the cumulative time of hypotension is not as

long. We mainly use phenylephrine and ephedrine depending on the heart rate.

b) Brad Berndt (Bronson Kalamazoo) - It is all dependent on heart rate, our first step is phenylephrine or ephedrine. We have easy access to phenylephrine infusions and try to encourage quicker utilization of infusions as opposed to boluses if it is a longer duration case. In OP for patients under regional anesthesia with little surgical stimulation, trying to get our providers to determine if we should keep the MAP elevated even if it may not be required. I get pushback from the CRNAs regarding younger patients who may not need a MAP of >65
c) Dennis Ahmad (Metro Health) - We are experiencing cultural issues around managing BP in younger and healthier patients. Having readily available phenylephrine and ephedrine in intraop is important. The availability and access is there and is what we need from a process improvement perspective in order to treat the MAPs <65 a little more aggressively
d) Mike Mathis (Michigan Medicine/MPOG via chat) - Re: vasopressor issue during free flaps -- this is an interesting one -- there was recent expert consensus (including oto surgeons) publication on this, favoring vasopressors for hypotension once correcting other contributing causes: https://journals.lww.com/johnajournal/Fulltext/2021/05010/Expert_consensus_statement_on_the_perioperative.8.aspx?WT.mc_id=HPxADx20100319xMP
e) Josh Berris (Beaumont Farmington via chat) - While we are still doing well on this measure. Having ephedrine as a controlled med has made things more difficult because people don't want to make it up "just in case" because of all the documentation.
f) Nirav Shah (Michigan Medicine/MPOG) - We have been moving to dilute norepinephrine in free flap cases in order to help flap perfusion
g) Joseph Ruiz (via chat) We looked at our free flap experience, Fang, Lin MD, PhD*; Liu, Jun PhD*; Yu, Cuicui MD†; Hanasono, Matthew M. MD*; Zheng, Gang MD†; Yu, Peirong MD* Intraoperative Use of Vasopressors Does Not Increase the Risk of Free Flap Compromise and Failure in Cancer Patients, Annals of Surgery: August 2018 - Volume 268 - Issue 2 - p 379-384 doi: 10.1097/SLA.000000000000229)
    (1) Nearly 6000 cases, no negative effects at any dose and at any time
h) Allison Janda (Michigan Medicine) - dilute norepinephrine does not come standard from the manufacturer. At other sites, are you having to compound it yourself or is pharmacy compounding it?
    (1) Angel Martino-Horrall (Northstar/Beaumont) - We have to compound it ourselves, which is a limiting factor to utilization
    (2) Brad Berndt (Bronson Kalamazoo) - Do you have pre-made syringes of norepinephrine at University of Michigan?
        (a) Nirav Shah (Michigan Medicine/MPOG) - we do, which has been very helpful. In both large and small syringe sizes, which has tilted me towards using more of it and less phenylephrine in general.

(b) Allison Janda (Michigan Medicine via chat): Yes, we have pre-made syringes compounded by our pharmacy (4mcg/mL). We have two sizes of syringes because you can go through the smaller syringes very quickly if using as an infusion. Same concentration (4mcg/mL) for the 20mL bolus syringes and the larger, 60mL infusion syringes to use on the Alaris syringe pumps.

(c) Christopher Miliken (Sparrow)- (via chat) Sparrow has pre-filled 10 ml phenylephrine syringes we use for Braun pumps. Infusion setup easy.

(3) Mike Mathis (Michigan Medicine/MPOG) - Pharmacy compounding has a big influence on whether or not you are going to use it.

i) Ksenia Koltun (Beaumont Royal Oak)- Are people starting phenylephrine infusions on the young and healthy patients just to meet the measure letting the lower MAP go because they are young and healthy?

(1) Josh Berris - Have always done this, not just for the measure

j) John LaGorio - Patients are coming in on more medications. I met with the quality director to go over that and see how we might have to adjust recommendations for holding preop medications (traditionally only ACEs and ARBS). May need to hold them further or liberalize NPO guidelines for those with afternoon surgeries to stay hydrated in the morning.

k) Kristine Veach (via chat) I have found that our Philips monitors report lower MAPs than if you were to calculate it with the equation. So if it is reporting 63-64 if is actually 65-66. Not sure if our staff is letting these "close enough" MAPs slide in young/healthy patients.

l) Josh Berris (via chat) What concentration of NE syringes are people using?

(1) Nirav - dilute epi is 4mcg/mL

m) Joseph Ruiz - (MD Anderson - via chat) If you decide to do a case where a patient has taken an ACE or ARB, what is the vasopressor of choice? Vasopressin or Norepi?

n) Joel Kileny (St. Joseph Ann Arbor - via chat) Is there a correlation between BP-03 performance and the end organ measures (AKI/Card 02 and 03)?

o) Josh Berris (Beaumont Farmington - via chat) Since osc. BP measure mean directly and calculates SBP and DBP, I don't see how that is possible on any OR monitor

p) John LaGorio (Mercy Musckegon - via chat) we often use vasopressin to address hypotension associated with ACEI/ARB

q) Kathleen Colins (St. Mary Livonia) -(via chat) We have phenylephrine, ephedrine and vasopressin in each OR. Rarely use NE. Interesting discussion

r) Mike Mathis (Michigan Medicine/MPOG) - (via chat) @Joel -- don't know answer to exactly that question, but we do have MPOG study looking at hypotension & AKI -- conclusion is that association does exist for moderate or high risk patients (strongest for high risk)… whereas no association for very low risk patients.

https://pubs.asahq.org/anesthesiology/article/132/3/461/108876/Preoperative-Risk-and-the-Association-between

s) Joseph Ruiz (MD Anderson - via chat) - Thanks John, case I usually face is in Interventional Radiology for an ablation a 2-3 hr. I was using Norepi, a colleague vasopressin which I will try in future. But I have delayed more and more

F. **SUS 01 - Fresh gas flow < 3 l/min when using inhalational anesthetic agent**

1. Description: Percentage of cases with mean fresh gas flow (FGF) ≤ 3L/min, during administration of halogenated hydrocarbons and/or nitrous oxide
2. Inclusion Criteria: Patients administered halogenated hydrocarbons and/or nitrous oxide, for greater than or equal to 30 minutes from placement of the airway device to removal of the airway device.
3. Exclusions:
    a) Cases in which halogenated hydrocarbons and nitrous oxide are NOT used
    b) Cases with maintenance period < 30 minutes
    c) Cases with >20% of Fresh Gas Flow values manually entered during the case (automated capture of FGF required)
4. Success: Mean FGF ≤ 3L/minute during the maintenance period of anesthesia, when administering inhalational agents
5. Performance scores shared with group; Very interesting comparison between sites inside and outside the state of Michigan
    a) Feedback: We are currently working with a few sites who are diligently working with on site technical team to capture this data.
6. This is ASPIRE's first population health measure. Should ASPIRE focus on population health issues like SUS 01? Or stay focused on measures related to patient outcomes? Is there risk with this measure (ie what is the downside)?
7. Peter Panagopolous (Beaumont Dearborn) - We saw our scores jump after a really good re-education effort getting providers in the same room a few months in a row and then 'bread and butter' vigilance. I think this has made a really good impact on us.
8. Nirav Shah (ASPIRE Director) - are these areas for ASPIRE to focus on?
    a) Peter - When you talk about smoking I think it definitely takes a village and key is definitely repetition. Once providers hear it more than once thats when it starts to sink in. Starting from PAS all the way through postop visits. These things are very impactful and really don't cost us much with the impact we are looking to make.
    b) Ksenia Kolton (Beaumont Royal Oak) - We have been working hard on this measure and have had a department wide lecture mainly focusing on this measure because we were doing poorly. In the month of May we have improved to 86% after that department meeting. Very happy to report we are heading in the right direction. Communication and getting everyone on the same page is key. We plan to do the same after this meeting to remind everyone we are still focusing on this.
    c) Nirav Shah (ASPIRE Director) - have you had any pushback from your providers on a measure like SUS01
    d) Ksenia Koltun (Beaumont Royal Oak) Not so much push back as much as providers are hesitatne to making change as theyve been providing

anesthesia for 20+ years and are ‘set in their ways’. Its still a touch and go, ie a little difficult, to get the fresh gas flows down immediately after induction and then to turn them back up for emergence. I think its a slow and steady change of culture/practice and i think providers understand the benefit.

e) Ashley Screws (St. Marys GR) - This is new for us I think its just built into our practice. We are still working on educating providers about this measure.

Meeting concluded at: 1210