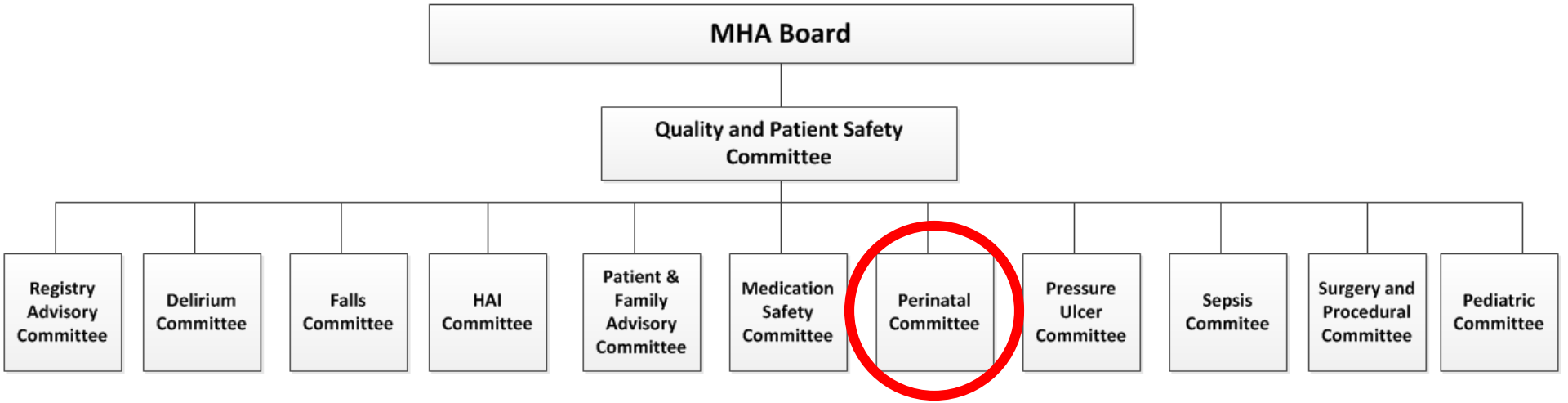
Minnesota Hospital Association

MHA Perinatal Webinar:

Maternal Venous Thromboembolism

Aug. 20, 2018

MHA Quality and Patient Safety Infrastructure



Perinatal Committee 2018 Work Plan Priorities

1. Perinatal road map adherence
2. NAS Road map development & implementation
3. Best practice sharing: Category II management, Maternal Venous Thromboembolism, disparities, and Maternal Early Warning Signs (MEWS)

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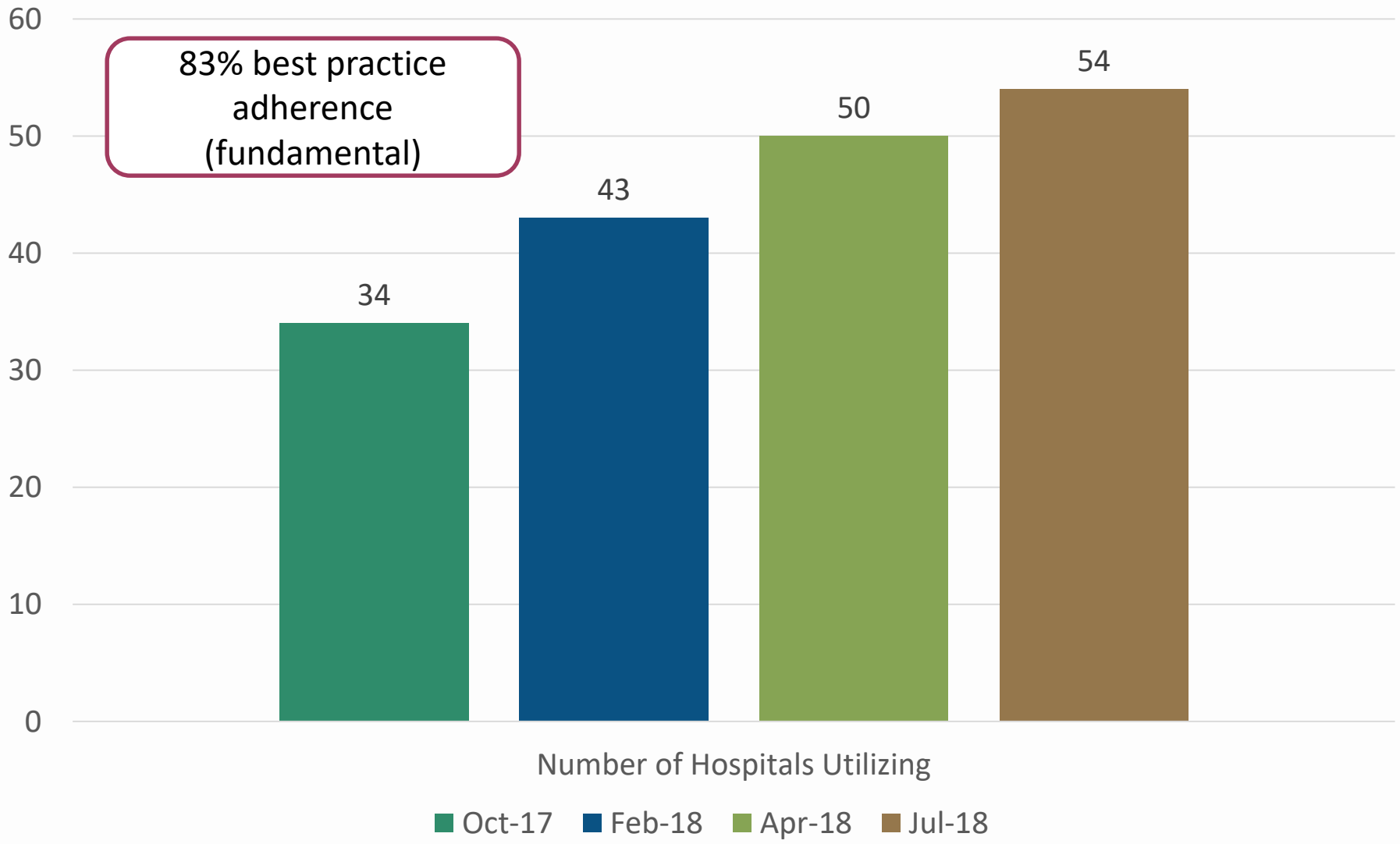
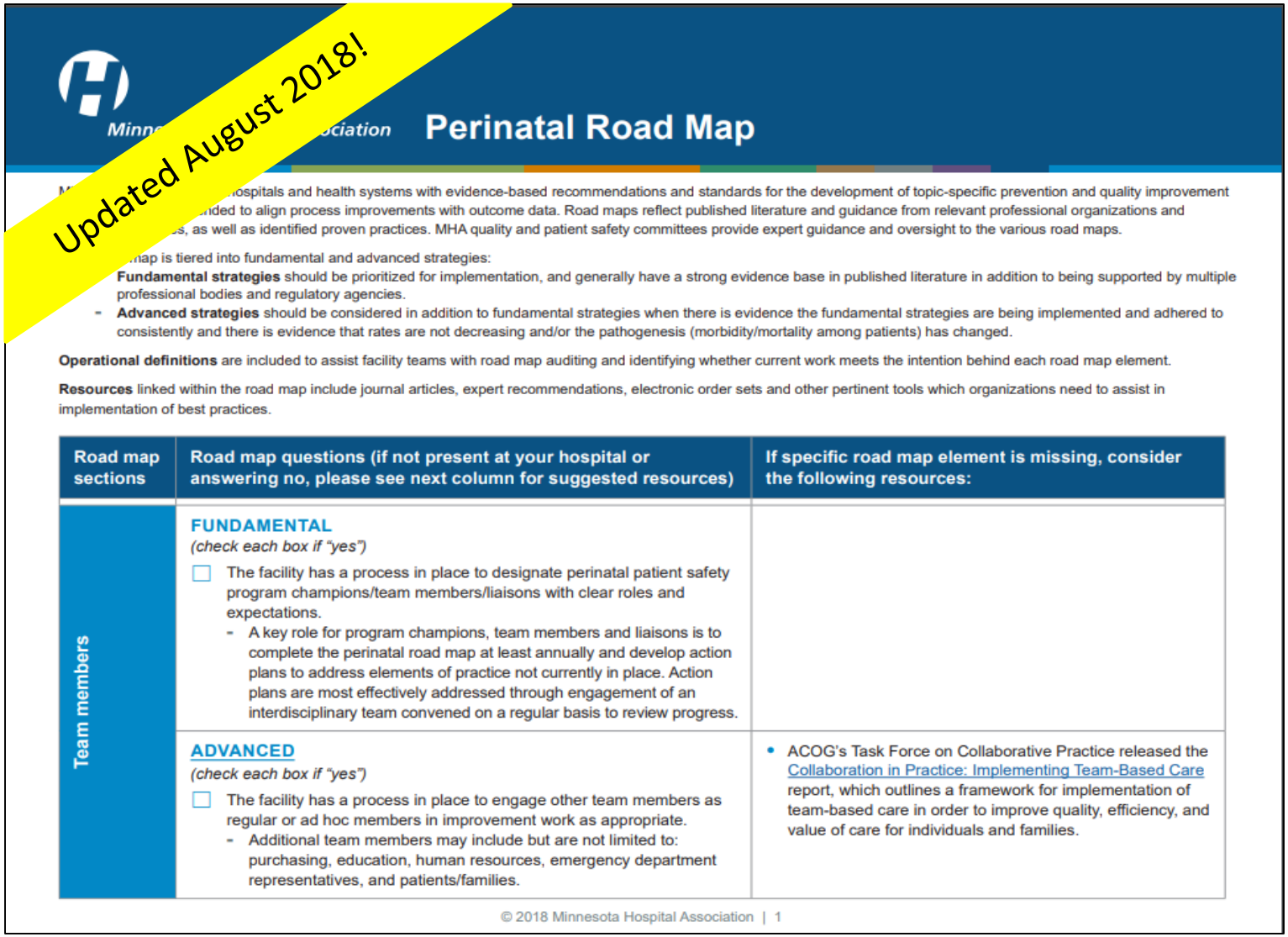
Perinatal road map utilization



Perinatal road map updates



Updated August 2018!

Minn… …ociation

Perinatal Road Map

M… …ospitals and health systems with evidence-based recommendations and standards for the development of topic-specific prevention and quality improvement …nded to align process improvements with outcome data. Road maps reflect published literature and guidance from relevant professional organizations and …s, as well as identified proven practices. MHA quality and patient safety committees provide expert guidance and oversight to the various road maps.

…map is tiered into fundamental and advanced strategies:

- **Fundamental strategies** should be prioritized for implementation, and generally have a strong evidence base in published literature in addition to being supported by multiple professional bodies and regulatory agencies.
- **Advanced strategies** should be considered in addition to fundamental strategies when there is evidence the fundamental strategies are being implemented and adhered to consistently and there is evidence that rates are not decreasing and/or the pathogenesis (morbidity/mortality among patients) has changed.

Operational definitions are included to assist facility teams with road map auditing and identifying whether current work meets the intention behind each road map element.

Resources linked within the road map include journal articles, expert recommendations, electronic order sets and other pertinent tools which organizations need to assist in implementation of best practices.

Road map sections	Road map questions (if not present at your hospital or answering no, please see next column for suggested resources)	If specific road map element is missing, consider the following resources:
Team members	**FUNDAMENTAL** *(check each box if "yes")* ☐ The facility has a process in place to designate perinatal patient safety program champions/team members/liaisons with clear roles and expectations. - A key role for program champions, team members and liaisons is to complete the perinatal road map at least annually and develop action plans to address elements of practice not currently in place. Action plans are most effectively addressed through engagement of an interdisciplinary team convened on a regular basis to review progress.	
	ADVANCED *(check each box if "yes")* ☐ The facility has a process in place to engage other team members as regular or ad hoc members in improvement work as appropriate. - Additional team members may include but are not limited to: purchasing, education, human resources, emergency department representatives, and patients/families.	• ACOG's Task Force on Collaborative Practice released the Collaboration in Practice: Implementing Team-Based Care report, which outlines a framework for implementation of team-based care in order to improve quality, efficiency, and value of care for individuals and families.

Perinatal road map deletions

- Outcome measures:
  - Eclampsia rate
  - Maternal sepsis rate

Perinatal road map additions

- Outcome measures:
  - Severe sepsis occurrence among pregnant & postpartum patients
- Perinatal patient safety interdisciplinary education:
  - Emergency department having capability to manage obstetric emergencies (eclampsia, OB hemorrhage, acute OB sepsis, hypertensive crisis)
- Fetal heart rate & uterine activity:
  - Requirement of provider/RN to conduct a vaginal exam and document dilation, effacement, station, and presentation prior to induction/augmentation as clinically appropriate

Perinatal road map additions

- Advanced surgical elements:
  - Vaginal cleansing prior to cesarean delivery to reduce post-surgical infections
  - Provision of azithromycin for women undergoing cesarean delivery or after membrane rupture
- New section – substance use & opioid prescribing
  - Includes opioid prescribing practices & participation in prescription drug monitoring program
  - NAS road map *(future addition)*

Perinatal road map – other notable changes

- Obstetric hemorrhage/cumulative blood loss
  - Updated to 1000mL per ACOG definition of hemorrhage
- Reprioritized to fundamental:
  - **VTE prevention**
  - PSI 17 (birth trauma rate, injury to neonate)
  - PC-05 exclusive breast milk feeding rate
  - Episiotomy rate
  - OB readmissions within 30 days
  - PC-02 cesarean section rate
- Reprioritized to advanced:
  - PSI 18 & 19 (obstetric trauma rate – vaginal deliveries with and without instrument)

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VTE AND PREGNANCY

Laura France, MD, FACOG

HealthEast®

California

Maternal

Quality

Care

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Maternal Venous Thromboembolism Task Force

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CMQCC
California Maternal
Quality Care Collaborative

Improving Health Care Response to Maternal Venous Thromboembolism: A California Quality Improvement Toolkit

February 2018

Funding for the development of this toolkit was provided by:

Federal Title V MCH Block Grant funding from the California Department of Public Health; Maternal, Child and Adolescent Health Division to Stanford University.

California Department of PublicHealth

Presentation Topics

- VTE relation to Maternal Mortality and Morbidity
- Summary of VTE Risk Assessment Guidelines
- Introduction to VTE Toolkit
  - First Prenatal Visit / Outpatient Prenatal Care
  - Antepartum Hospitalization
  - Birth Hospitalization
  - Post-discharge Extended Duration Anticoagulation

VTE Relation to Maternal Mortality and Morbidity

Venous Thromboembolism (VTE)

VTE complicates 1-4 per thousand pregnancies and is a leading cause of maternal mortality and severe morbidity

VTE encompasses:

- Deep Venous Thromboembolism (DVT)
  - 80% of VTE in pregnancy presents as DVT
- Pulmonary Embolism (PE)
  - 20% of VTE in pregnancy manifests as PE

James, A.H., *Prevention and management of venous thromboembolism in pregnancy.* Am J Med, 2007. **120**(10 Suppl 2): p. S26-34.

Virchow's Triad

- All three components of Virchow's triad (hypercoagulability, stasis, and vascular damage) are exacerbated by the physiologic and hormonal changes associated with pregnancy
- This results in a >5 fold increased risk of VTE during pregnancy

Bourjeily, G., et al., *Pulmonary embolism in pregnancy.* Lancet, 2010. **375**(9713): p. 500-12.

VTE and U.S. Maternal Mortality

- From 2006 to 2010, the PERCENTAGE contribution to pregnancy-related deaths from embolism slightly declined; however, the absolute INCIDENCE of maternal death from PE has remained stable at ~1/100,000 pregnancies or 10% of U.S. maternal deaths
- The U.S. maternal death rate due to PE has remained stable despite ACOG 2011 recommendation to apply mechanical compression devices to all patients undergoing cesarean
- The incidence of VTE has actually increased over the same time frame

Creanga, A.A., et al. Pregnancy-related mortality in the United States, 2006-2010 *Obstet Gynecol.* (2015,Jan);125(1):5-12.
Friedman, Am J Obstet Gynecol 2014;212:221.e1-12

The California Pregnancy-Associated Mortality Review (CA-PAMR)

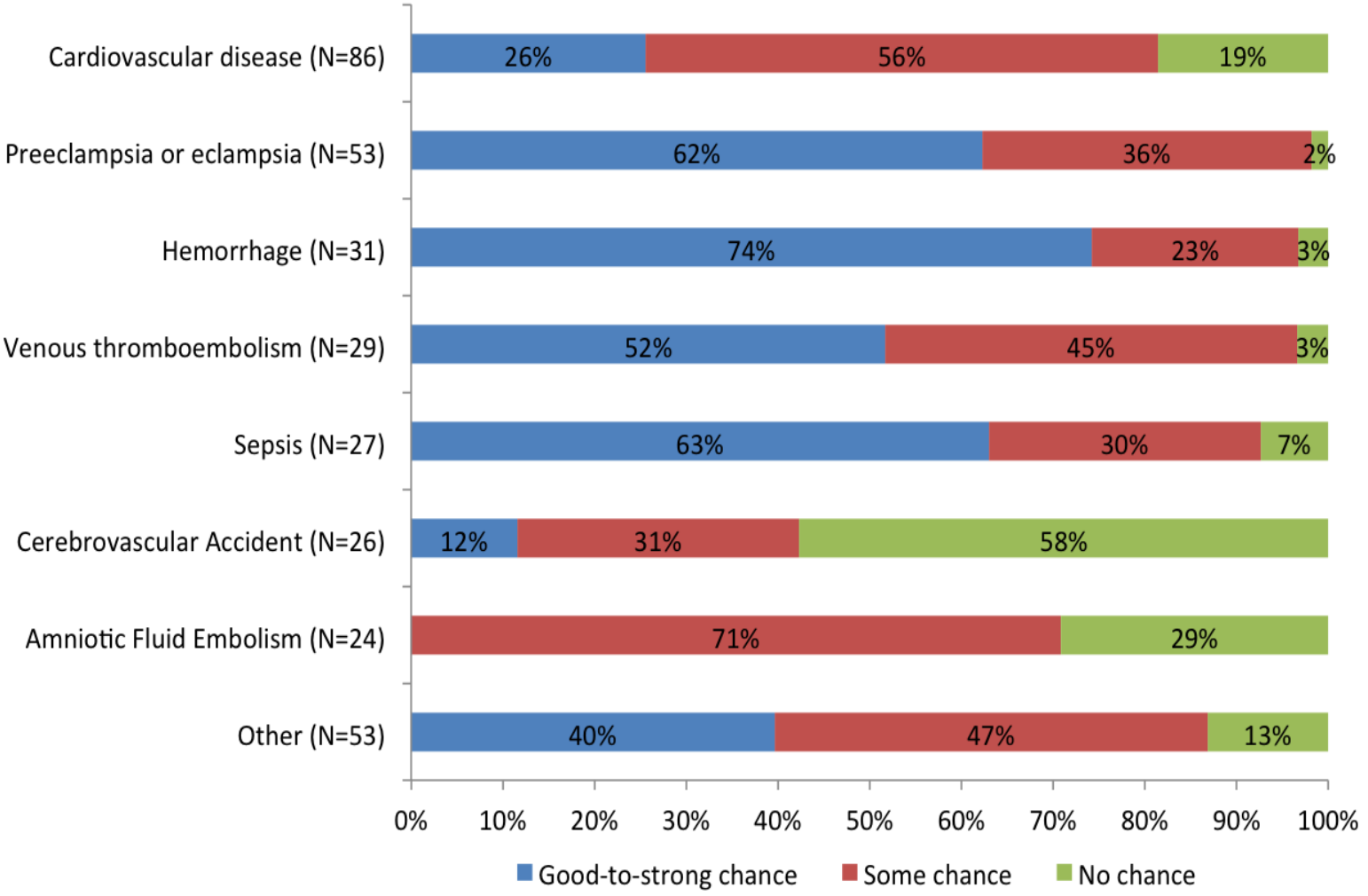
- Initiated in 2004 to:
  - Investigate the rise in maternal mortality and the widening racial/ethnic disparity
  - Identify pregnancy-related deaths, their causes, associated risks and areas of prevention opportunities
  - Direct public health policy and programmatic interventions
  - Recommend quality improvements for maternity care

Pregnancy-Related Mortality from VTE in California: 2002-2007

- 5th leading cause of pregnancy-related death
- Accounted for 9% (n=29) of all pregnancy-related deaths in California
- Nearly all **(97%)** these deaths had at least:
  - Some chance of preventability (45%) and
  - More than half **(52%)** had a **Good-to-Strong** chance of preventability

The California Pregnancy-Associated Mortality Review. Report from 2002-2007 Maternal Death Reviews. Sacramento: California Department of Public Health, Maternal Child and Adolescent Health Division. 2017

CA-PAMR Pregnancy-Related Deaths, Chance to Alter Outcome by Grouped Cause of Death; 2002-2007 (N=329)



- The CA-PAMR committee was unable to determine the preventability in 2 hemorrhage deaths, 1 cardiovascular and 1 preeclampsia/eclampsia death.

Pregnancy-Related Mortality from VTE in California: 2002-2007

Significant Association with Obesity and Cesarean Delivery

- Overall, 17% of the women who had a pregnancy-related maternal death in California had a BMI ≧ 35
- Among VTE related deaths, 61% of women had a BMI ≥ 35 (crude OR of ~7.4; RR of ~3.6)
- Additionally, 80% of the obese women who died from VTE had a cesarean delivery (crude OR of ~6.7; RR of ~2.5)

The California Pregnancy-Associated Mortality Review. Report from 2002-2007 Maternal Death Reviews. Sacramento: California Department of Public Health, Maternal Child and Adolescent Health Division. 2017

Maternal Mortality Associated with Pulmonary Embolism **"Tip of the Iceberg"**

Given the obstetric PE case mortality rate of 3%, with ~ 25% of all VTE events manifesting as PE, approximately 132 VTE events occur for every one maternal death resulting from PE

Hameed AB, Montgomery D, Peterson N, Morton CH, and A Friedman. Improving Health Care Response to Maternal Venous Thromboembolism. Developed under contract #11-10006 with the California Department of Public Health, Maternal, Child and Adolescent Health Division. Published by the California Department of Public Health, 2017.

VTE Associated Morbidity: Long-term Impacts

- Recurrent VTE/PE
- Post-thrombotic syndrome may complicate up to 50% of DVT patients and may lead to:
  - Chronic leg pain
  - Edema
  - Erythema
  - Ulcerations
- Lung damage
- Cardiovascular effects

Vazquez, S. R. and S. R. Kahn Circulation 2010 121(8): e217-219; Pengo V, N Engl J Med. 2004;350(22):2257

VTE Risk Assessment: Standard Practice for all Medical Surgical Patients

- **AHRQ** (The Agency for Healthcare Research and Quality) defined VTE as the "number one patient safety practice" for hospitalized patient
- **Joint Commission** All hospitalized patients to have VTE prophylaxis *or* documentation why no VTE prophylaxis was given – **Quality Measure VTE 1**
- **NQF** (National Quality Forum) Safe Practices recommendations:
  - Routine evaluation of hospitalized patients for risk of VTE
  - Use of appropriate prophylaxis

Shojania KG, (Eds.).(2001). "Making healthcare safer; A critical analysis of patient safety practices (Evidence Report/Technology Assessment No. 43)." (AHRQ Publication NO.01-E058).
Joint Commission (2015). Specifications Manual for National Hospital Inpatient Quality Measures v.5.1
National Quality Forum. National Voluntary Consensus Standards for Prevention and Care of Venous Thromboembolism. (2006)

VTE Prophylaxis

VTE is the "single cause of death most amenable to reduction by systematic change in practice"

Steven Clark, M.D., Semin Perinatol 2012;36(1):42-7

Council on Patient Safety In Women's Healthcare / Alliance for Innovation on Maternal Health Collaborative Consensus

Professional Organizations

- Obstetricians – ACOG & SMFM
- Family Practitioners – AAFP
- Anesthesia – ASA / SOAP
- Midwives – ACNM
- Nurse Anesthetists – AANA
- Nurses – AWHONN
- Nurse Practitioners – NPWH

Facility Organizations

- American Hospital Association
- Hospital Corporation of America
- Voluntary Hospital Association
- American Association of Birth Centers

State / Federal Health & Regulatory

- HRSA –MCHB
- The Joint Commission
- Centers for Medicare and Medicaid
- Multiple state perinatal quality collaboratives

D'Alton, Obstet Gynecol 2014;123:973

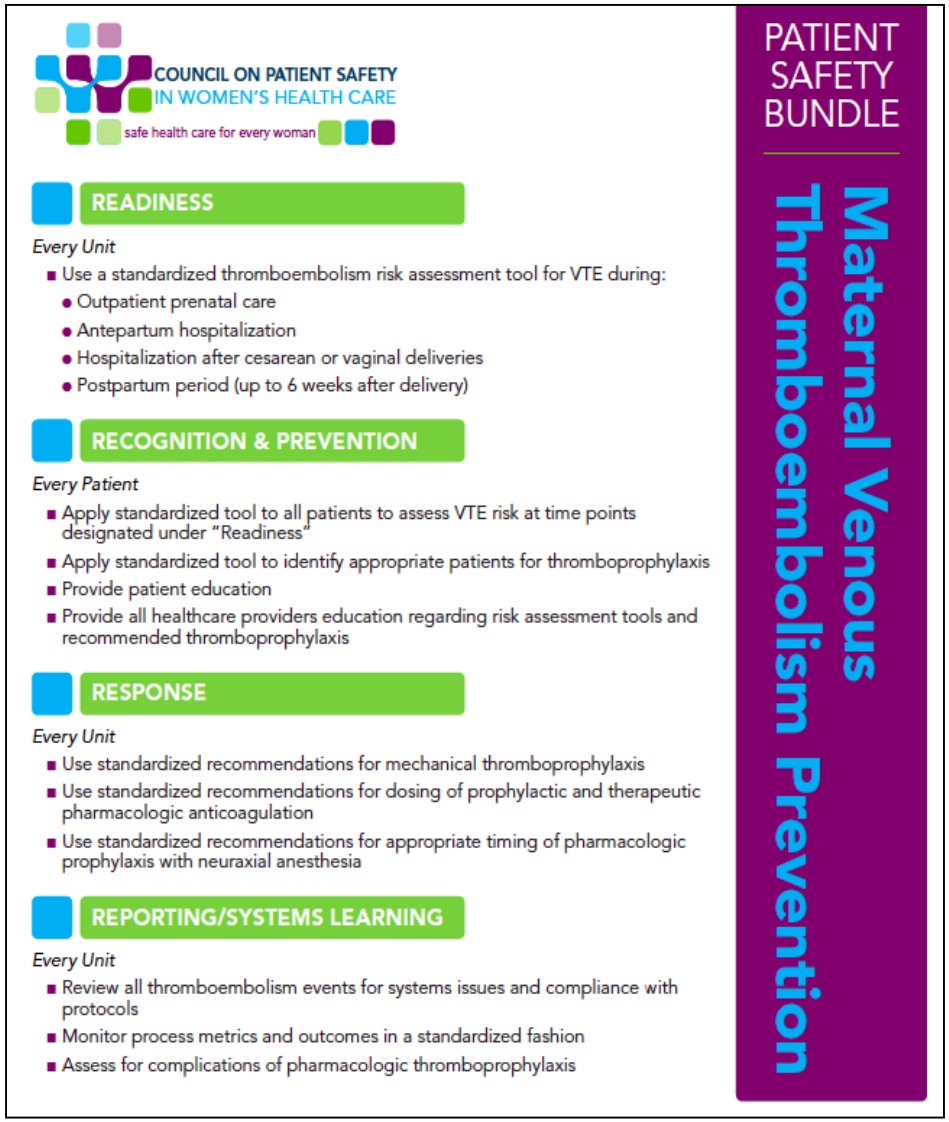
VTE Bundle

AIM Safety Bundle
Approved by
Council on Patient Safety
and posted on website

safehealthcareforeverywoman.org

COLLABORATIVE CONSENSUS
Simultaneous Publications
D'Alton, Friedman et al.

Obstetrics and Gynecology
Anesthesia and Analgesia
Journal of Obstetric and Gynecologic Nursing



Note: Image in the public domain

J Obstet Gynecol Neonatal Nurs. 2016 Sep-Oct;45(5):706-17 Obstet Gynecol. 2016 Oct;128(4):688-698. Anesth Analg. 2016 Oct;123(4):942-9

Council on Patient Safety In Women's Healthcare: VTE Prevention Risk Assessment

All women should be assessed for VTE risk at multiple time intervals in pregnancy including:

- Initial presentation for prenatal care
- Hospitalization for an antepartum indication
- Birth hospitalization (admission and in-house postpartum)
- Upon discharge home postpartum

D'Alton, Friedman et al Obstet Gynecol 2016;128:688–98

Summary of
VTE Risk Assessment Guidelines

VTE Prevention Risk Assessment

- VTE risk assessment tools should be applied to *every* patient to determine risk for VTE
- Risk assessment based on major guidelines:
  - **NPMS** - National Partnership for Maternal Safety
  - **ACOG** - American College of Obstetricians and Gynecology
  - **ACCP** - American College of Chest Physicians
  - **RCOG** - Royal College Obstetricians and Gynecologists
- Pharmacologic prophylaxis may be with:
  - Unfractionated heparin (UFH) or
  - Low-molecular weight heparin (LMWH)
    - LMWH is a preferred antepartum medication

VTE Prevention Risk Assessment

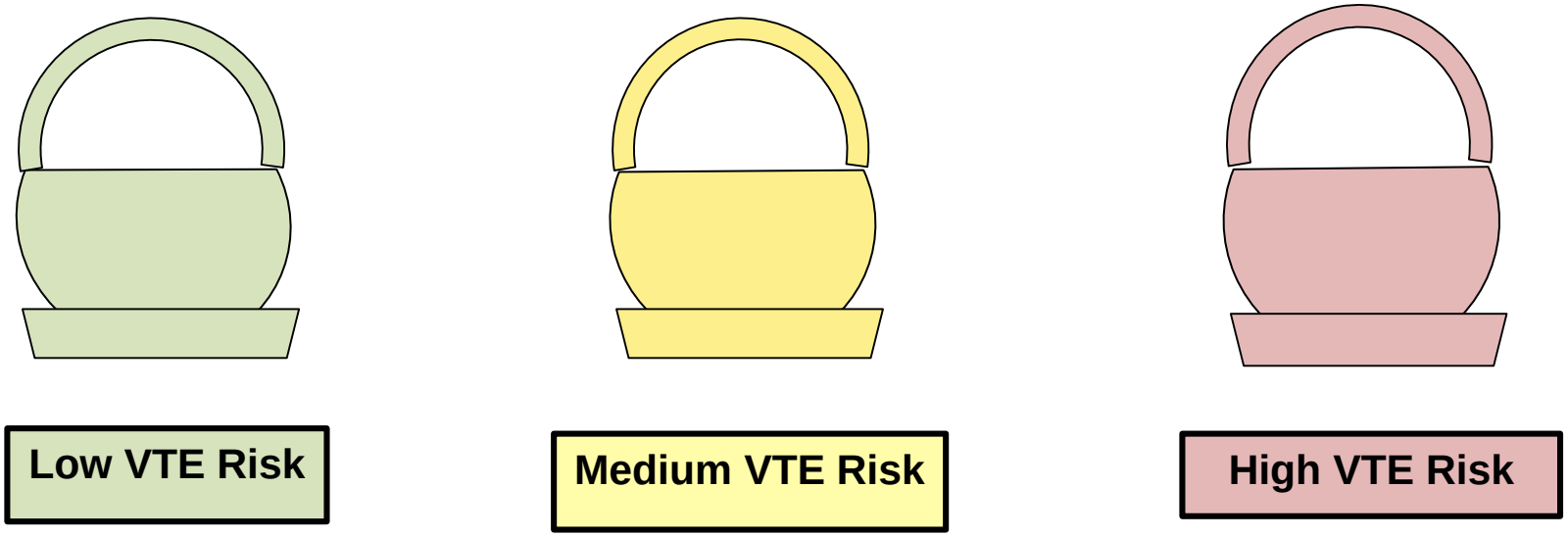
Protocol Implementation

- **Link VTE risk** to appropriate strength **PROPHYLAXIS choices**
  - Higher VTE risk linked with stronger prophylaxis
- **Minimize levels of risk**
  - 3 bucket model
- **Minimize complexity**
  - Avoid complex point scoring system

Maynard J Thromb Thrombolysis (2010) 29:159–166, Maynard AHRQ VTE PREVENTION 2015

3 Levels of VTE Risk

Utilize the “3 bucket model” risk assessment that stratifies VTE risk in pregnant or postpartum women into three color-coded levels for rapid identification



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Provoked VTE

When is it Low vs. High Risk?

- Pregnant women who experience provoked VTE from the following factors are considered LOW risk and do not need antepartum pharmacologic prophylaxis
  - Major/ orthopedic surgery
  - Indwelling line
  - Immobilization
- Pregnant women who experience provoked VTE while they were taking estrogen (or who have had a VTE during a prior pregnancy) are considered HIGH risk and should be treated with antepartum and postpartum pharmacologic prophylaxis

Hameed AB, Montgomery D, Peterson N, Morton CH, and A Friedman. Improving Health Care Response to Maternal Venous Thromboembolism. Developed under contract #11-10006 with the California Department of Public Health, Maternal, Child and Adolescent Health Division. Published by the California Department of Public Health, 2017.

Thrombophilia Classification

Low Risk Thrombophilia	High Risk Thrombophilia
• Factor V Leiden mutation (heterozygous) • Prothrombin gene mutation (heterozygous) • Protein S deficiency • Protein C deficiency	• Factor V Leiden mutation (homozygous) • Prothrombin gene mutation (homozygous) • Compound heterozygote for Factor V and Prothrombin gene mutation • Antithrombin III deficiency • Antiphospholipid syndrome (APS)

ACOG Practice Bulletin No 138, 2013 & 132, 2012

Heparin Dosing Regimens

- **PROPHYLACTIC HEPARIN**
  - LMWH (Enoxaparin fixed dose 40 mg once a day) *or*
  - UFH dosing trimester dependent (ACOG 2013)
  - Low Dose UFH 5,000 U SQ BID
- **THERAPEUTIC HEPARIN**
  - LMWH (Enoxaparin 1 mg/kg twice a day) *or*
  - UFH 10,000 international units or more subcutaneously every 12 hours adjusted to target aPTT (1.5-2.5) 6 hours after injection

LMWH: low molecular weight heparin; UFH: unfractionated heparin; aPTT: activated partial thromboplastin time

Hameed AB, Montgomery D, Peterson N, Morton CH, and A Friedman. Improving Health Care Response to Maternal Venous Thromboembolism. Developed under contract #11-10006 with the California Department of Public Health, Maternal, Child and Adolescent Health Division. Published by the California Department of Public Health, 2017.

Introduction to the VTE Toolkit

Hameed AB, Montgomery D, Peterson N, Morton CH, and A Friedman. Improving Health Care Response to Maternal Venous Thromboembolism. Developed under contract #11-10006 with the California Department of Public Health, Maternal, Child and Adolescent Health Division. Published by the California Department of Public Health, 2017.

VTE Taskforce Recommendations

4 critical time points for risk assessment and prophylaxis

- First Prenatal Visit/Outpatient Prenatal Care
- Antepartum Hospitalization (non-delivery)
- Birth Hospitalization including cesarean and vaginal
- Post-Discharge Extended Duration Anticoagulation

Hameed AB, Montgomery D, Peterson N, Morton CH, and A Friedman. Improving Health Care Response to Maternal Venous Thromboembolism. Developed under contract #11-10006 with the California Department of Public Health, Maternal, Child and Adolescent Health Division. Published by the California Department of Public Health, 2017.

Antepartum Outpatient Prophylaxis First Prenatal Visit

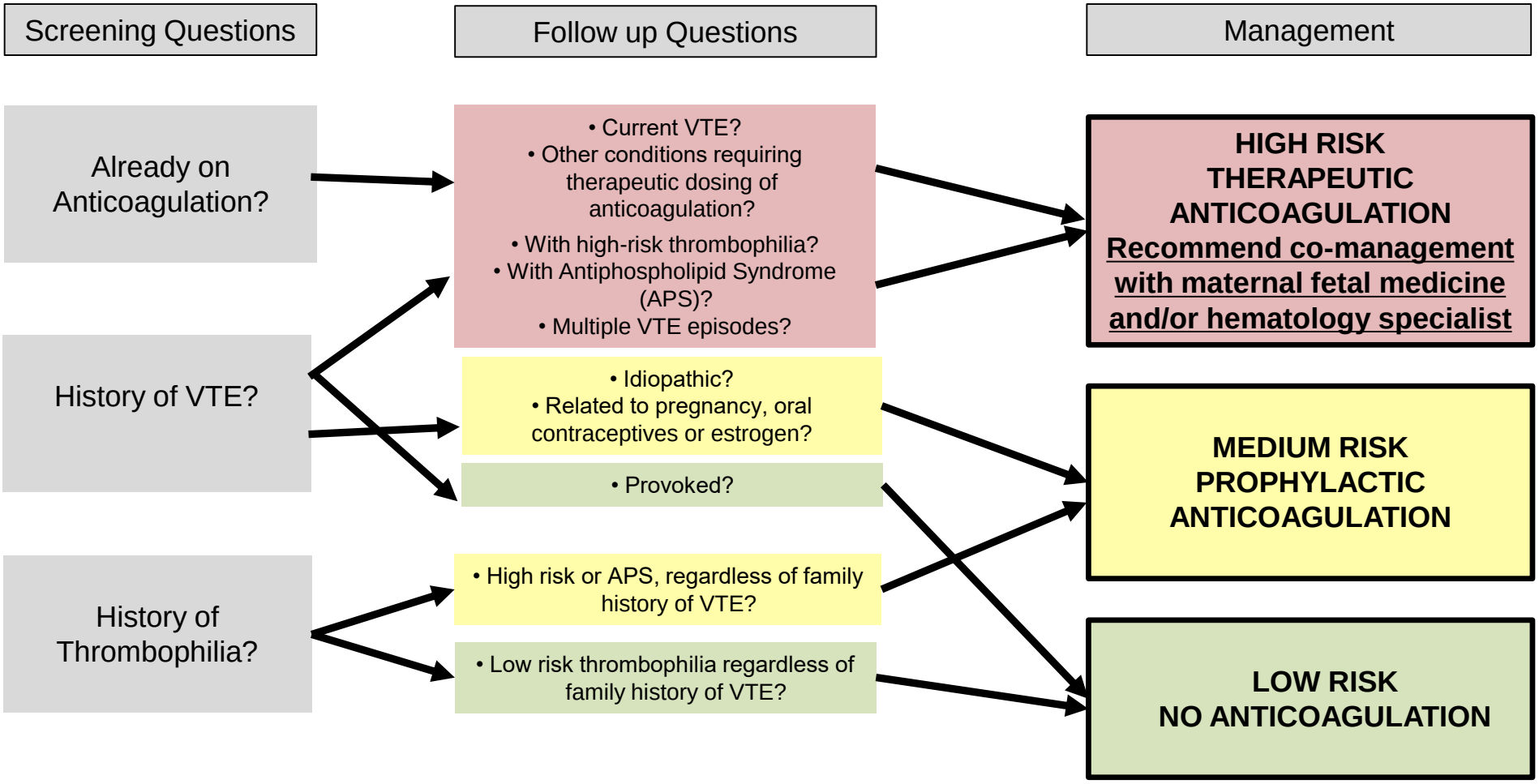
Major guidelines

- AIM Safety Bundle – Council on Patient Safety in Women's Healthcare
- ACCP - American College of Chest Physicians
- ACOG - American College of Obstetricians and Gynecologists

Agree

Identify High Risk Patients by:
Personal history of prior VTE and/or
Thrombophilia

Algorithm 1: First Prenatal Visit Maternal VTE Risk Assessment



Antepartum Outpatient Prophylaxis First Prenatal Visit

Clinical History	Risk Level	Management
• Low risk thrombophilia (isolated) • Low risk thrombophilia with family history of VTE • Prior *provoked* VTE	**LOW**	**No treatment**
• Prior VTE idiopathic • Prior VTE with pregnancy or oral contraceptive • Prior VTE with low risk thrombophilia • Family history of VTE with high risk thrombophilia • High risk or antiphospholipid syndrome (APS)	**MEDIUM**	**Prophylactic dose** LMWH or UFH
• Current VTE or other conditions requiring therapeutic dose of anticoagulation • Multiple prior VTE episodes • Prior VTE with high-risk thrombophilia • Prior VTE with APS	**HIGH**	**Therapeutic dose** LMWH or UFH ***Recommend co-management with maternal-fetal medicine and/or hematology specialist***

VTE Taskforce Recommendations

4 critical time points for risk assessment and prophylaxis

- First Prenatal Visit/Outpatient Prenatal Care
- Antepartum Hospitalization (non-delivery)
- Birth Hospitalization including cesarean and vaginal
- Post-Discharge Extended Duration Anticoagulation

Antepartum Non-Delivery Hospital Admission

The Council for Patient Safety in Women's Healthcare working group recommends thromboprophylaxis with daily LMW heparin or twice-daily unfractionated heparin for **all antepartum patients hospitalized for at least 72 hours** who are not at high risk for bleeding or imminent childbirth

D'Alton, Friedman et al,Obstet Gynecol 2016;128:688–98,RCOG Green-top Guideline No. 37a April 2015

Modified PADUA Risk Assessment Model for OB

Risk Factors	Points
Previous VTE	**3**
Reduced mobility (bedrest with bathroom privileges for at least ≥72 hours	**3**
Thrombophilia	**3**
Acute infection and/or Rheumatologic disorder	1
Pregnancy	1
Obesity (BMI > 25 kg/m2)	1

Barbar, Noventa et al. 2010; D'Alton, Friedman et al. 2016; Harris, Sulmers et al. 2016

Antepartum Hospital Admission

- TWO LARGE COHORTS with SIMILAR RESULTS:

  - **HOSPITALIZED ≥ 3 days 12-18 increased VTE risk**
  - **HOSPITALIZED < 3 days 4 times increased VTE risk**

- VTE risk in hospitalized pregnant women approaches that of high-risk non-pregnant patients in whom VTE thromboprophylaxis is currently recommended such as those with prior events and high-risk thrombophilia

Sultan, et al. BMJ. (2013 Nov); 7: 347, Virkus et. al. 2014 PLoS ONE 9(5): e96495. doi:10.1371/journal.pone.0096495

Antepartum Hospital Admission

Encourage Ambulation

- All women hospitalized antepartum should be encouraged to:
  - Maintain Full Ambulation
  - Ensure Hydration
  - **Utilize Mechanical Prophylaxis** (knee length sequential compression devices) while in bed

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Antepartum Hospital Admission

Encourage Ambulation

- Specific activity levels should be individualized
  - Use of specific goals, such as “ambulate every hour while awake,” will make implementation more successful
- A recent review found that the greatest impact of early ambulation was achieved with the use of structured and standardized mobility protocols

Hameed AB, Montgomery D, Peterson N, Morton CH, and A Friedman. Improving Health Care Response to Maternal Venous Thromboembolism. Developed under contract #11-10006 with the California Department of Public Health, Maternal, Child and Adolescent Health Division. Published by the California Department of Public Health, 2017.

Pashikanti 2012 et al, Clin Nurse Spec 26(2): 87-94.

Antepartum Admission Risk Assessment (part 1)

Clinical History	Risk Level	Anticoagulation
Encourage ambulation and avoid dehydration at all risk levels		
All patients not in high risk category with anticipated admission < 72 hours	**LOW**	Mechanical prophylaxis placed on admission continue through discharge Reassess at 72 hours
All patients admitted not in high risk category with anticipated or actual length of stay ≥ 72 hours	**MEDIUM**	Mechanical prophylaxis placed on admission continue through discharge PLUS Prophylactic-dose LMWH or UFH in collaboration with anesthesia

Antepartum Admission Risk Assessment (part 2)

Clinical History	Risk Level	Anticoagulation
Encourage ambulation and avoid dehydration at all risk levels		
High risk or Antiphospholipid Syndrome (APS), with no prior VTE, regardless of family history Prior provoked, idiopathic, or estrogen related VTE Low risk thrombophilia **AND** family history of VTE OR single prior VTE OR Patients already receiving LMWH or UFH as outpatient Multiple prior VTE episodes Prior VTE <u>and</u> high risk or APS	**HIGH**	*Mechanical prophylaxis placed on admission continue through discharge* **<u>PLUS</u>** Prophylactic dose LMWH / UFH in collaboration with anesthesia **OR** *Mechanical prophylaxis placed on admission continue through discharge* **<u>PLUS</u>** Prophylactic ***or*** Therapeutic dose LMWH / UFH consistent with antepartum dosing in collaboration with anesthesia

Algorithm 2: Antepartum Hospitalization: Maternal VTE Risk Assessment

Screening Questions

- Already on anticoagulation?
- Personal history of any VTE?
- High risk thrombophilia?
- Low risk thrombophilia PLUS family history of VTE?

Yes

- Anticipated or actual length of stay > 72 hours?

Yes

No to all questions

Encourage ambulation and avoid dehydration for women at all risk levels

HIGH RISK

HEPARIN dose depends on VTE risk

Consult with Anesthesia prior to starting heparin regarding choice and dose of pharmacological prophylaxis

Mechanical prophylaxis *combined with* UFH / LMWH on admission continue through discharge

Prophylactic *or* Therapeutic dose consistent with outpatient dose if:

Previously on antepartum anticoagulation

Prophylactic dose if:

- Prior provoked VTE *or*
- Low risk thrombophilia plus family history of VTE

MEDIUM RISK

Mechanical prophylaxis placed on admission **PLUS** prophylactic dose LMWH/UFH, continue *through discharge*

LOW RISK

Mechanical prophylaxis only – reassess at 72 hours

(No pharmacologic prophylaxis indicated for isolated low risk thrombophilia)

Antepartum Hospital Admission

- Benefits of VTE risk reduction *may be outweighed by risks of emergent general anesthesia.* We strongly recommend **anesthesia consult** prior to a decision to initiate pharmacologic prophylaxis
- For women at high risk of delivery or bleeding, mechanical thromboprophylaxis should be utilized
- Consider prophylaxis with low dose unfractionated heparin as an alternative to LMWH, which may facilitate neuraxial anesthesia

VTE Taskforce Recommendations

4 critical time points for risk assessment and prophylaxis

- First Prenatal Visit/Outpatient Prenatal Care
- Antepartum Hospitalization (non-delivery)
- Birth Hospitalization including cesarean and vaginal
- Post-Discharge Extended Duration Anticoagulation

Birth Hospitalization

- "Placement of mechanical compression devices prior to cesarean and continued post-op is recommended for all women"

- "For patients undergoing cesarean with *additional risk factors* for thromboembolism, individual risk assessment may require thromboprophyalxis with *both* **mechanical compression device + UFH/ LMWH**

ACOG Practice Bulletin No 123, 2011

VTE Pregnancy-Related Mortality in California 2002-2007 **Role of Obesity**

- 28 of the 29 women who died from VTE in California were postpartum
  - **61%** had a delivery **BMI of ≥ 35 kg/m2**
  - **In contrast, 28%** of women who died of *all non-VTE causes* had delivery **BMI ≥ 35** (OR 3.96, CI 1.8, 8.8)
- Of the women with BMI ≥ 35 who died from VTE (n=17), 75% had a cesarean

The California Pregnancy-Associated Mortality Review. Report from 2002-2007 Maternal Death Reviews. Sacramento: California Department of Public Health, Maternal Child and Adolescent Health Division. 2017

ACCP Recommendations

One Major Risk Factor VTE risk ~ 3%	2 Minor Risk Factors VTE risk ~ 3%

▪ Immobility (strict bed rest ≥ 1 week in the antepartum period)
▪ Postpartum hemorrhage ≥1000 mL with surgery
▪ Previous VTE
▪ Pre-eclampsia *with* fetal growth restriction
▪ Thrombophilia
  ○ Antithrombin deficiency
  ○ Factor V Leiden (homo or heterozygous)
  ○ Prothrombin G20210A (homo or heterozygous)
▪ Medical conditions
  ○ Systemic Lupus erythematosus
  ○ Heart disease
  ○ Sickle cell disease
▪ Blood transfusion
▪ Postpartum infection
	▪ BMI >30 kg/m2
	▪ Multiple pregnancy
	▪ Emergency caesarean
	▪ Smoking >10 cigarettes/day
	▪ Fetal growth restriction
	▪ Thrombophilia
	  ○ Protein C deficiency
	  ○ Protein S deficiency
	▪ Preeclampsia

Bates SM et al. VTE, thrombophilia, antithrombotic therapy, and pregnancy: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest. 2012 Feb;141(2 Suppl):e691S-736S

Cesarean Birth
Major and Minor VTE Risk Factors

MAJOR VTE RISK FACTORS	MINOR VTE RISK FACTORS
▪ **BMI > 35 kg/m2** @ delivery ▪ **Low risk thrombophilia** ▪ **Postpartum hemorrhage requiring**: Transfusion or further operation, (e.g. hysterectomy, D&C) or Interventional Radiology procedure ▪ **Infection requiring antibiotics** ▪ **Antepartum hospitalization ≥ 72 hours**, current or within the last month ▪ **Chronic medical conditions**: Sickle Cell disease, Systemic Lupus Erythematosus, Significant Cardiac disease, active Inflammatory Bowel Disease, active cancer, Nephrotic syndrome	▪ Multiple gestation ▪ Age > 40 ▪ Postpartum hemorrhage ≥1000 ml but ***not requiring:*** Transfusion or further operation, (e.g. hysterectomy, D&C) or Interventional Radiology procedure ▪ Family history of VTE (VTE occurring in a first-degree relative prior to age 50) ▪ Smoker ▪ Preeclampsia

Women with one major or two minor risk factors should receive in-hospital post cesarean pharmacologic prophylaxis

Cesarean Birth VTE Risk Assessment and Suggested Prophylaxis

Clinical History	Risk Level	Prophylaxis Regimen
Encourage ambulation and avoid dehydration at all risk levels. All women having cesarean birth receive mechanical prophylaxis.		
Not meeting medium or high risk criteria	**LOW**	Mechanical prophylaxis placed prior to cesarean and continued until fully ambulatory
Cesarean Delivery with 1 Major ***or*** **≥ 2** Minor Risk Factors	**MEDIUM**	Mechanical prophylaxis placed prior to cesarean and continued until fully ambulatory **PLUS** Prophylactic dose LMWH / UFH postpartum, continue until discharge
Prior VTE **High risk thrombophilia** **Already on anticoagulant**	**HIGH**	Mechanical prophylaxis placed prior to cesarean and continued until fully ambulatory **PLUS** Patient specific anticoagulation

Delivery Risk Assessment

Prior VTE or Thrombophilia (most already on anticoagulation)

Clinical History	Risk Level	Prophylaxis Regimen
High risk thrombophilia (including acquired) no prior VTE, regardless of family history Prior provoked, idiopathic, or estrogen related VTE Low risk thrombophilia AND family history of VTE OR single prior VTE Patients already receiving LMWH or UFH as outpatient Multiple prior VTE Prior VTE with High Risk thrombophilia (including APS)	**HIGH**	Mechanical prophylaxis placed prior to cesarean and continued until fully ambulatory **PLUS** **Prophylactic** dose LMWH / UFH in hospital and continued until 6 weeks from date of delivery Mechanical prophylaxis placed prior to cesarean and continued until fully ambulatory **PLUS** **Therapeutic** dose LMWH / UFH postpartum (Postpartum dose ≥ Antepartum dose) in hospital and continued until 6 weeks from delivery date after discharge

VTE Pregnancy-Related Mortality in California: 2002-2007

Of the 29 women who died from VTE in 2002-2007:

- 64% were obese, the highest proportion among all causes of pregnancy-related mortality
- 25% of the women had BMI >40
- 26% of the women who gave birth and died of VTE had a vaginal birth (n=7)
- 74% had a cesarean delivery, primarily scheduled or unplanned during labor

Takeaway:

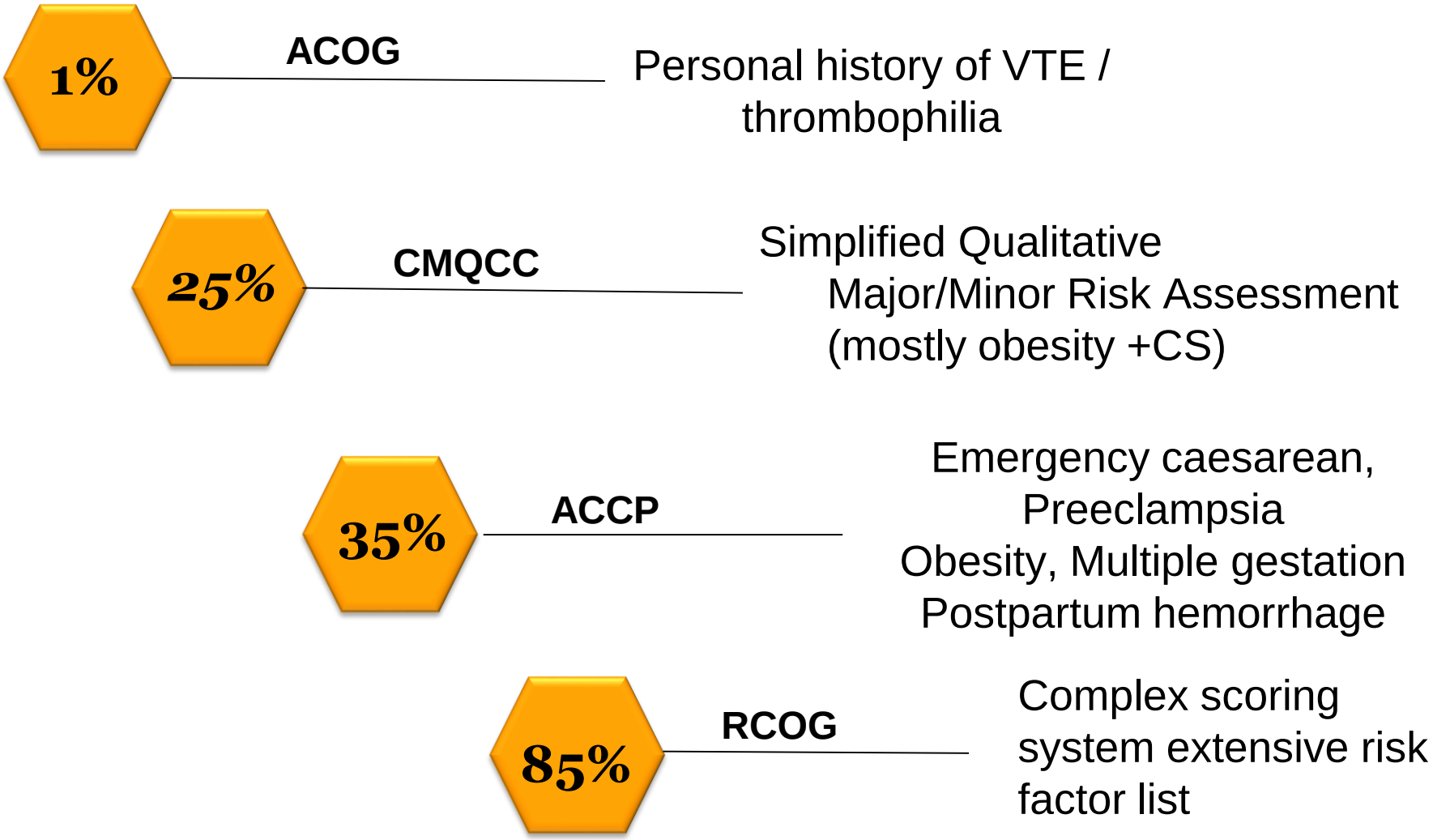
VTE mortality risk increases with increased BMI

The California Pregnancy-Associated Mortality Review. Report from 2002-2007 Maternal Death Reviews. Sacramento: California Department of Public Health, Maternal Child and Adolescent Health Division. 2017

Vaginal Birth VTE Risk Assessment and Suggested Prophylaxis

Clinical History	Risk Level	Anticoagulation
Encourage ambulation and avoid dehydration at all risk levels		
Delivery BMI ≥ 40 kg/m²	**LOW**	Mechanical prophylaxis placed prior to delivery and continued until fully ambulatory
Delivery BMI ≥ 40 kg/m² **PLUS** Antepartum hospitalization ≥ 3 days, anticipated currently or within past month **OR** **Delivery BMI ≥ 40 kg/m² PLUS** Low Risk Thrombophilia	**MEDIUM**	Mechanical prophylaxis placed prior to delivery and continued until fully ambulatory **PLUS** Prophylactic dose LMWH / UFH **postpartum hospitalization** **BMI ≥ 40 kg/m² plus thrombophilia** (consider LMWH/UFH continuation 6 weeks postpartum)
Prior VTE **High risk thrombophilia** **Already on anticoagulant** **OR** Low risk thrombophilia **AND** family history of VTE ***ANY*** single prior VTE	**HIGH**	Mechanical prophylaxis placed prior to delivery and continued until fully ambulatory **PLUS** Patient specific postpartum anticoagulation

Percentage of Patients Pharmacologic Prophylaxis Guideline Comparison



Pharmacologic Prophylaxis BMI > 40 kg/m^2 at Delivery

BMI LEVEL	RECOMMENDED PERIPARTUM REGIMEN
BMI ≤ 40 kg/m^2	Mechanical prophylaxis placed prior to delivery and continued until fully ambulatory, with initiation of pharmacological prophylaxis in accordance with anesthesia guidelines. (See Table 10). Mechanical prophylaxis placed prior to delivery and combined with UFH 5000 units subcutaneously every 8-12 hours initiated on discharge from PACU, with combined mechanical and pharmacologic prophylaxis continued until discharge
BMI > 40 kg/m^2	***OR ALTERNATIVELY*** Mechanical prophylaxis placed prior to delivery and combined with UFH 5000 units every 12 hours initiated on discharge from PACU, with UFH continued until enoxaparin 40 mg every 12 hours can be initiated post neuraxial procedure, with combined mechanical and pharmacologic prophylaxis continued until discharge.

Neuraxial Blockade and Peripartum Anticoagulation

Antepartum / Intrapartum: Minimum time periods between discontinuing antepartum anticoagulation and performing neuraxial blockade	
UFH dose ≤ 10,000 IU/day	No contraindications to timing of heparin dose and performance of neuraxial blockade
UFH dose >10,000 IU/day	**Wait 6 hours after the last dose of UFH prior to neuraxial blockade** *then check APTT* ▪ If APTT within normal limits – block may be considered ▪ IF APTT elevated, delay block 1 hr. then recheck APTT
LMWH prophylaxis	**Wait ≥12 hours post last dose prior to neuraxial blockade**
LMWH therapeutic dosing	**Wait ≥24 hours post last dose prior to neuraxial blockade**

Leffert L, Butwick A, Carvalho B, Arendt K, Bates SM, Friedman A, Horlocker T, Houle T, Landau R, SOAP VTE Taskforce. The Society for Obstetric Anesthesia and Perinatology Consensus Statement on the Anesthetic Management of Pregnant and Postpartum Women Receiving Thromboprophylaxis or Higher Dose Anticoagulants. Anesthesia & Analgesia (2017): doi: 10.1213/ANE.0000000000002530

Neuraxial Blockade and Peripartum Anticoagulation (continued)

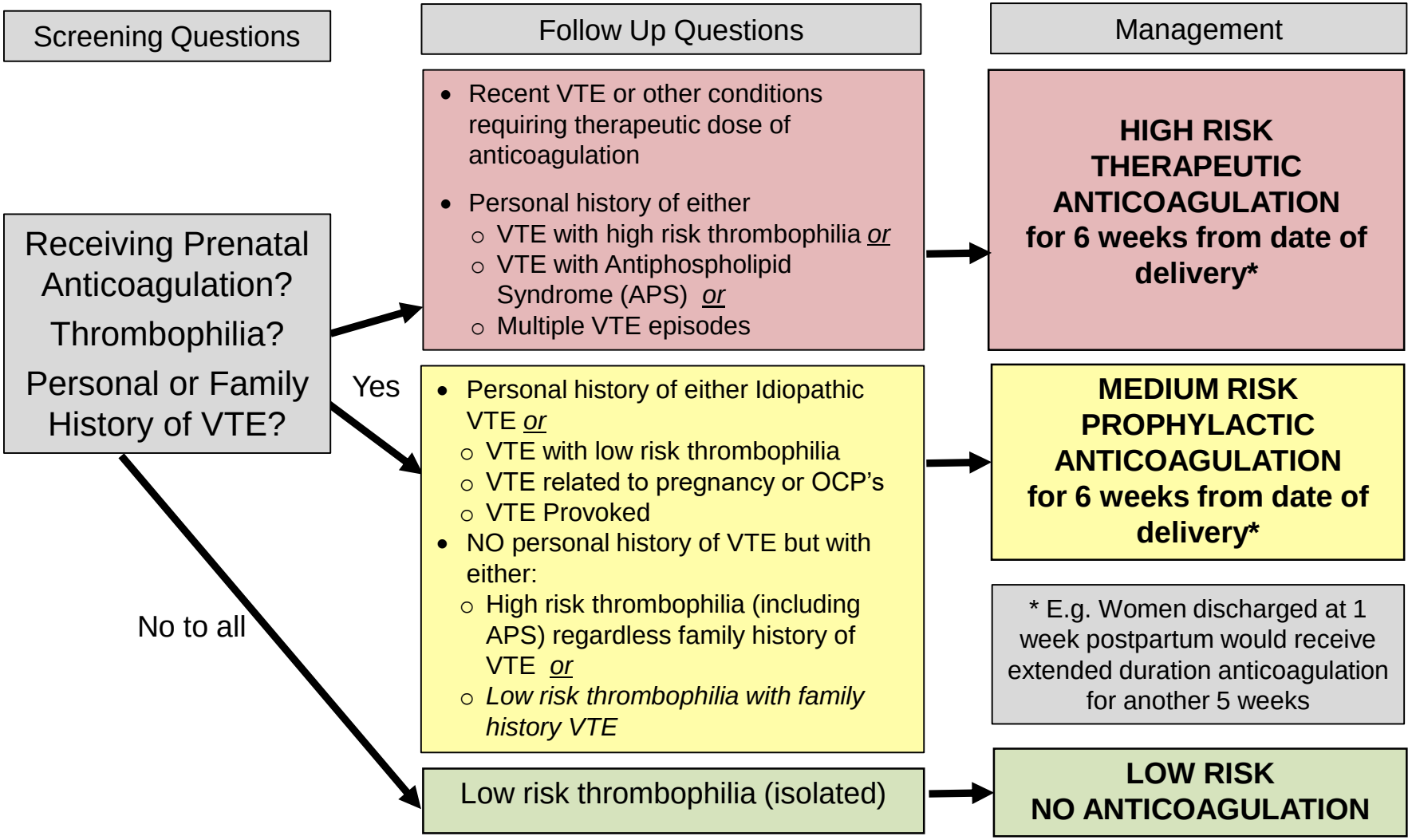
Postpartum: Minimum time periods between neuraxial block *or* epidural catheter removal and first postpartum dose of anticoagulant	
UFH prophylaxis (≤10,000 IU/day)	**Wait ≥ 1 hour** after epidural catheter removal or spinal procedure
UFH therapeutic (>10,000 IU/day)	**Wait ≥ 1 hour** after epidural catheter removal or spinal procedure
LMWH prophylaxis *(e.g. enoxaparin 40 mg qd or q 12 hours)*	**After neuraxial blockade: wait ≥ 12 hours before first dose of LMWH** For patients receiving post-cesarean epidural analgesia: wait ≥ 4 hours after epidural catheter removal (provided that 12 hours has elapsed since cesarean section)
LMWH therapeutic dosing *(e.g., enoxaparin 1mg / kg Q 12 hours or 1.5 mg /kg Q 24 hours)*	**After neuraxial blockade: wait ≥ 24 hours before first dose LMWH** Indwelling catheters should be removed before initiation of therapeutic LMWH. For patients receiving post-cesarean epidural analgesia: wait ≥ 24 hours after epidural catheter removal before first dose of LMWH.

VTE Taskforce Recommendations

4 critical time points for risk assessment and prophylaxis

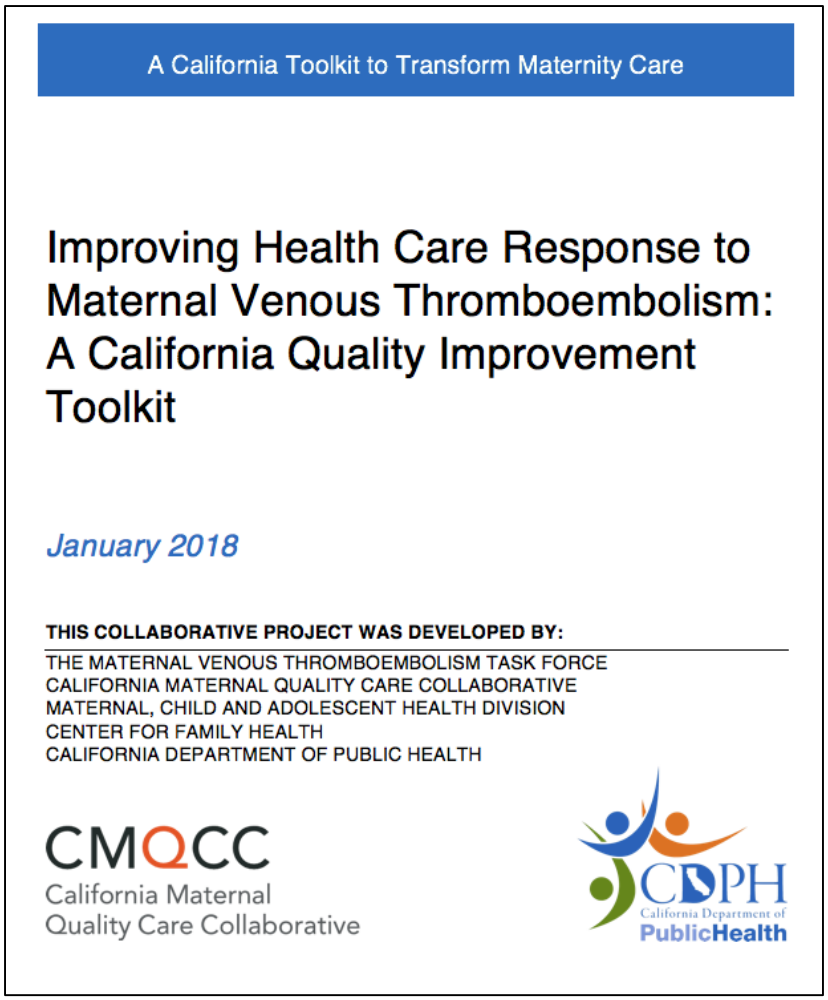
- First Prenatal Visit/Outpatient Prenatal Care
- Antepartum Hospitalization (non-delivery)
- Birth Hospitalization including cesarean and vaginal
- Post-Discharge Extended Duration Anticoagulation

Algorithm 3: Post-Discharge Extended Duration Anticoagulation: Maternal VTE Risk Assessment



Implementation Recommendations

- VTE risk assessment tools should be applied to *every patient* to determine risk for VTE
- Optimal implementation depends on
  - **Standardized protocols**
  - Protocol development to include & educate : Obstetrics, Anesthesia, Pharmacy, Nursing
  - **Protocol integration into Order Sets**
  - Memory aids (laminated protocols) / E alerts
  - Audit & rapid feedback; retrospective & concurrent



- For more information and to Download the Toolkit
- Visit
  - www.cmqcc.org
  - https://www.cdph.ca.gov
- Contact:
  - Info@cmqcc.org

Key Obstetric VTE Guidelines

- D'Alton, Friedman et al National Partnership for Maternal Safety Consensus bundle on venous thromboembolism Obstet Gynecol 2016;128:688–98
- National Partnership for Maternal Safety. Council for Patient Safety in Women's Health Care. Available at: http://www.safehealthcareforeverywoman.org/maternal-safety.html. Retrieved May 1, 2015.
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SBAR FOR PROVIDERS

- **Situation:**
- Venous thromboembolism (VTE) is a leading cause of severe maternal morbidity and mortality. Prevention and mitigation of this through prevention and thromboprophylaxsis is part of a national strategy and should be adapted and implemented in every maternity unit.
- **Background:**
- VTE complicates about 1-4/1000 pregnancies, accounting for 9% of maternal deaths in US.
- This rate aligns with data from CA-Pregnancy Associated Mortality Review, where 97% of deaths had some chance of preventability and more than half had a good-to-strong chance.
- Consensus bundle created/published as part of the National Partnership for Maternal Safety.

SBAR FOR PROVIDERS

- **Assessment:**
- VTE risk assessment on admission to the hospital continues from prenatal clinic risk assessment.
- **RN** completes admission VTE risk assessment in nursing admission navigator.
- Two or more regular risk factors or one * factor place patient at higher risk. Risk factors include: ***anticoagulation this pregnancy (not including baby aspirin), ***any personal history of VTE, ***BMI≥40, BMI 30-39, multiple gestation, antepartum prolonged immobility >24 hours, in vitro fertilization this pregnancy, intrauterine growth restriction, hypertensive disorder, thrombophilias (e.g. prothrombin 2021DA or homozygous factor V Leiden, lupus anticoagulant or elevated anticardiolipin antibodies, Protein C or S deficiency, homozygous MTHFR, other congenital or acquired thrombolphilias), medical complications (e.g. heart disease, lupus, renal disease, sickle cell or other major medical condition), major Infection (e.g. sepsis, pyelonephritis, pneumonia, Triple I), smoking/Ecigarette use within last week

SBAR FOR PROVIDERS

- Risk-based interventions for women have been built into antepartum order sets (PPROM, PTL and Hypertensive Disorders of Pregnancy), post-vaginal and post-cesarean birth orders.
- OB **Provider** completes 2nd risk assessment when entering post-birth orders. High-risk admission assessment auto-populates orders with high-risk options. Low-risk admission status may change at delivery and **instructions read** "Assess & select postpartum VTE option-Patient High Risk if EBL > 1000 mL, Triple I, or general anesthesia". Provider then has 5 order options: Low Risk, Enoxaparin, Heparin, Mechanical only or No VTE prophylaxis.
- Option to enter orders when Admission VTE risk assessment not completed also available.
- OB **Provider** also addresses VTE section on Maternal Discharge Order Set (hard stop)

--Low Risk, no medications require
--High Risk, anticoagulation prescription ordered
--High Risk, no anticoagulation (reason for no anticoagulation ordered needs to be addressed as done for any high-risk hospitalized patient)

SBAR FOR PROVIDERS

- **Recommendations:**
- OB providers and RNS review Consensus Bundle, incorporate recommendations into practice.
- Review new order screen shots.
- Discharge planning and prophylaxis at provider discretion.
- Review Maternal Venous Thromboembolism Prevention E-learning module from ACOG.

SBAR FOR PROVIDERS

References/Resources

- CMQCC. Improving Health Care Response to Maternal Venous Thromboembolism: A California Quality Improvement Toolkit. February 2018. at https://www.cmqcc.org/qi-initiatives/venous-thromboembolism-pregnancy-and-postpartum. Public access if short survey completed.
- D'Alton ME, Friedman AM, Smiley, RM et al. October 2016. *National Partnership for Maternal Safety Consensus Bundle on Venous Thromboembolism.* Published in *Anestheisa & Analgesia 123(4): 942-949; Journal of Midwifery & Women's Health |https://doi.org/10.1111/jmwh.12544; JOGNN 45(5): 706-717; Obstetrics& Gynecology* 128(4): 688-6-98.
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SBAR FOR PROVIDERS

References/Resources, continued

- Maternal Venous Thromboembolism Prevention E-learning module (public access) http://safehealthcareforeverywoman.org/aim-emodules/#1484874538623-11c032cb-e489
- Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium Green-top Guideline 37a. Royal College of Obstetricians & Gynaecologists https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg37a/

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VTE ADMISSION NURSING NAVIGATOR ASSESSMENT

VTE Risk Assessment - One risk with * or two or more other factors put patient at higher risk.

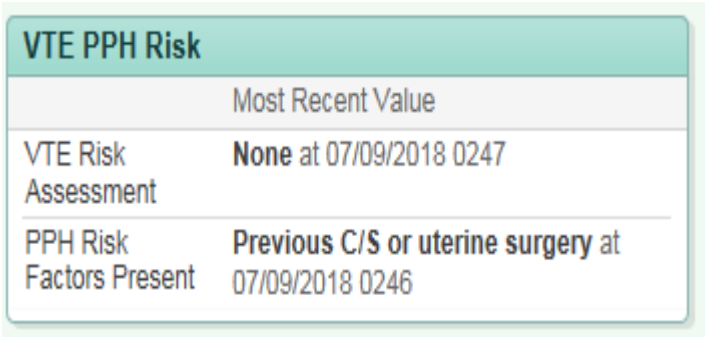
- ***Anticoagulation this pregnancy (not including baby ASA)**
- ***Any personal history of VTE**
- ***Pre-pregnancy BMI >/= 40**
- Pre-pregnancy/1st pregnancy visit BMI 30-39
- Antepartum bedrest/prolonged immobility >24 hours
- In vitro fertilization this pregnancy
- Intrauterine growth restriction
- Hypertensive Disorder (e.g. chronic HTN, gest HTN, pre-eclampsia, HELLP)
- Thrombophilia (e.g. Prothrombin 20210A or homozygous factor V Leiden, Lupus anticoagulant or elevated anticardiolipin antibodies, Protein C or S deficiency, homozygous MTHFR, other congenital or acquired thrombophilia)
- Medical Complications (e.g. heart disease, lupus, renal disease, sickle cell or other major medical condition)
- Major Infection (e.g. sepsis, pyelonephritis, pneumonia, Triple I [chorio])
- Smoking/e-cigarette use within last week
- Multiple gestation

EPIC COMMUNICATION

- VTE Risk assessment on nursing admission navigator
- Banner presents across top of summary page

High Risk of VTE

- VTE PPH Risk presents on summary page when completed

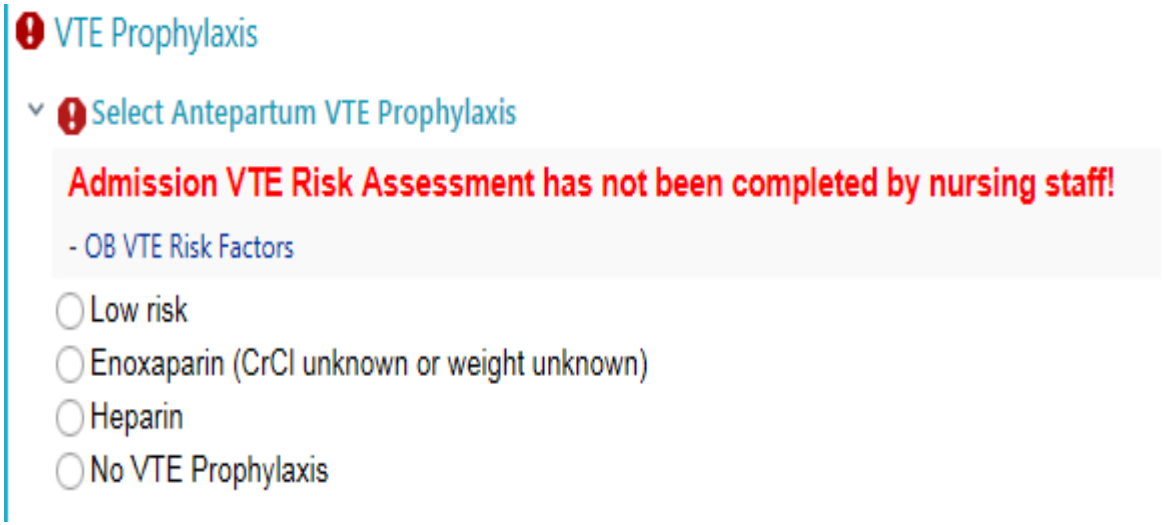


VTE PPH Risk	
	Most Recent Value
VTE Risk Assessment	**None** at 07/09/2018 0247
PPH Risk Factors Present	**Previous C/S or uterine surgery** at 07/09/2018 0246

- Additional risk assessment completed at time of entering post partum/post cesarean orders by provider

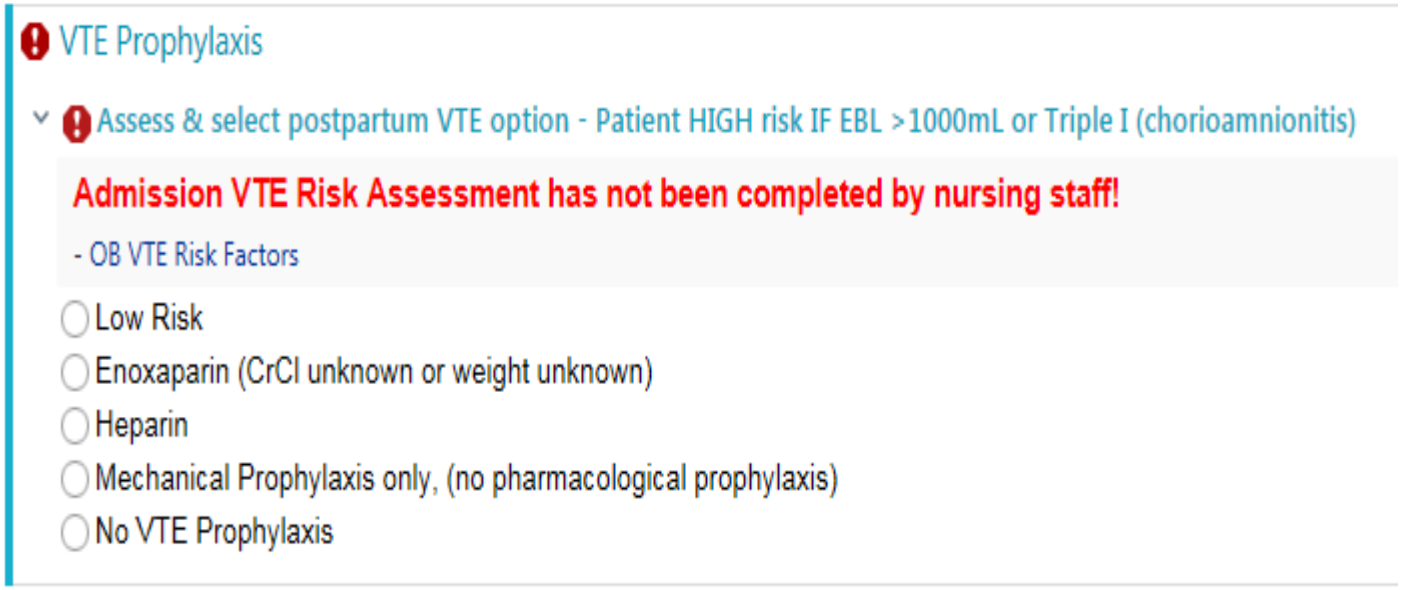
ORDERS-ANTEPARTUM (PPROM, PTL, HTN)

- All options if no risk assessment completed prior to order entry.
- Appropriate risk option to display on orders if risk assessment completed



ORDERS POST VAGINAL BIRTH

- All options if no risk assessment completed prior to orders entered
- If assessment done, order is to populate with Low or High Risk
- If Low Risk, provider needs to consider additional delivery information and chose appropriate option



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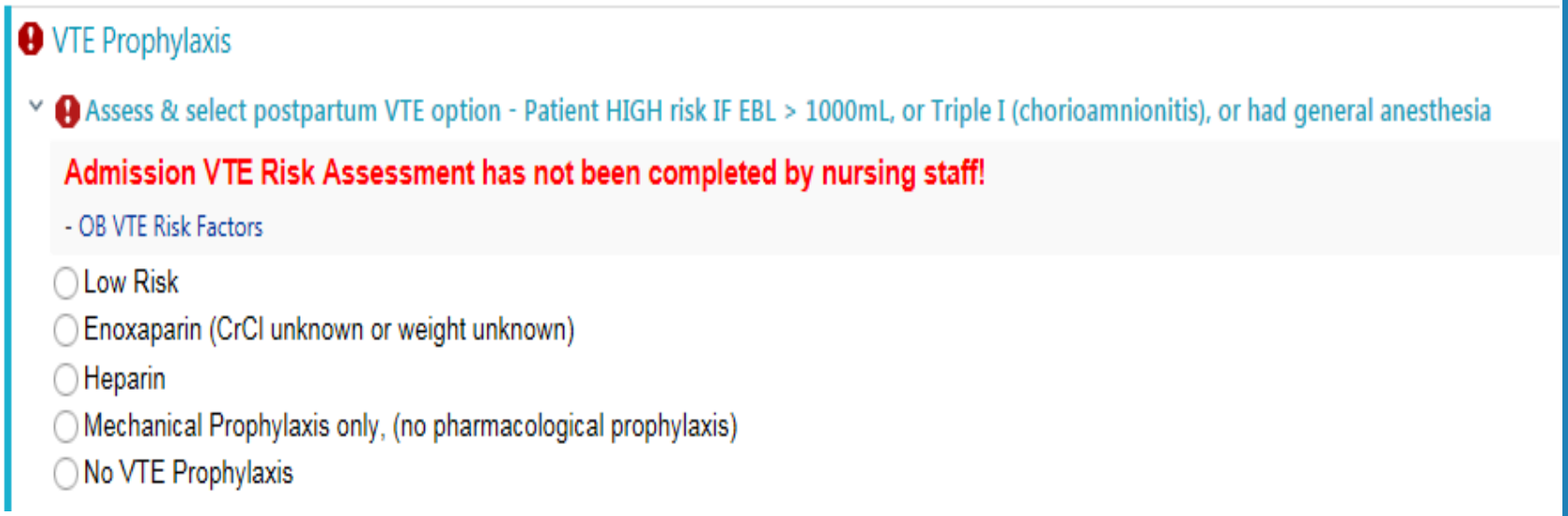
ORDERS POST CESAREAN BIRTH

- All options if no risk assessment completed prior to orders entered
- If assessment done, order is to populate with Low or High Risk
- If Low Risk, provider needs to consider additional delivery information and chose appropriate option



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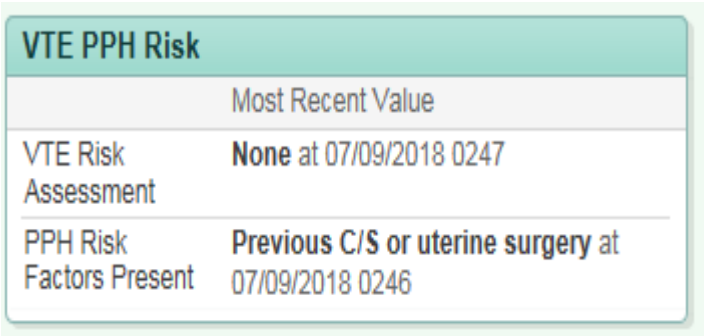
IN PROCESS

- Provider address VTE risk upon discharge
- Epic build challenges



VTE PPH Risk

	Most Recent Value
VTE Risk Assessment	**None** at 07/09/2018 0247
PPH Risk Factors Present	**Previous C/S or uterine surgery** at 07/09/2018 0246

- Utilized education through Safe Healthcare for Everywoman E-learning module
- Process outcomes to commence when Epic has been fixed
- Nursing is doing the admission navigator risk assessment

Questions

Upcoming perinatal webinar

“Assessing and managing obstetrical sepsis”

Thursday, Sept. 20, 2018

3 – 4 p.m.

Register online:
https://web.telspan.com/register/240mnhospitals/septemberqpsupdate

Presenters

Dr. Suresh Ahanya – MN Perinatal Physicians

Breanne Loesch, RN – Allina East Region Sepsis Coordinator

Mary Goering, MPH, RN – Perinatal Clinical Practice Coordinator, United Mother Baby Center