Health Challenges – During Pregnancy and Labor & Delivery

Iowa OB Summit
Sept. 17, 2019
Des Moines, Iowa

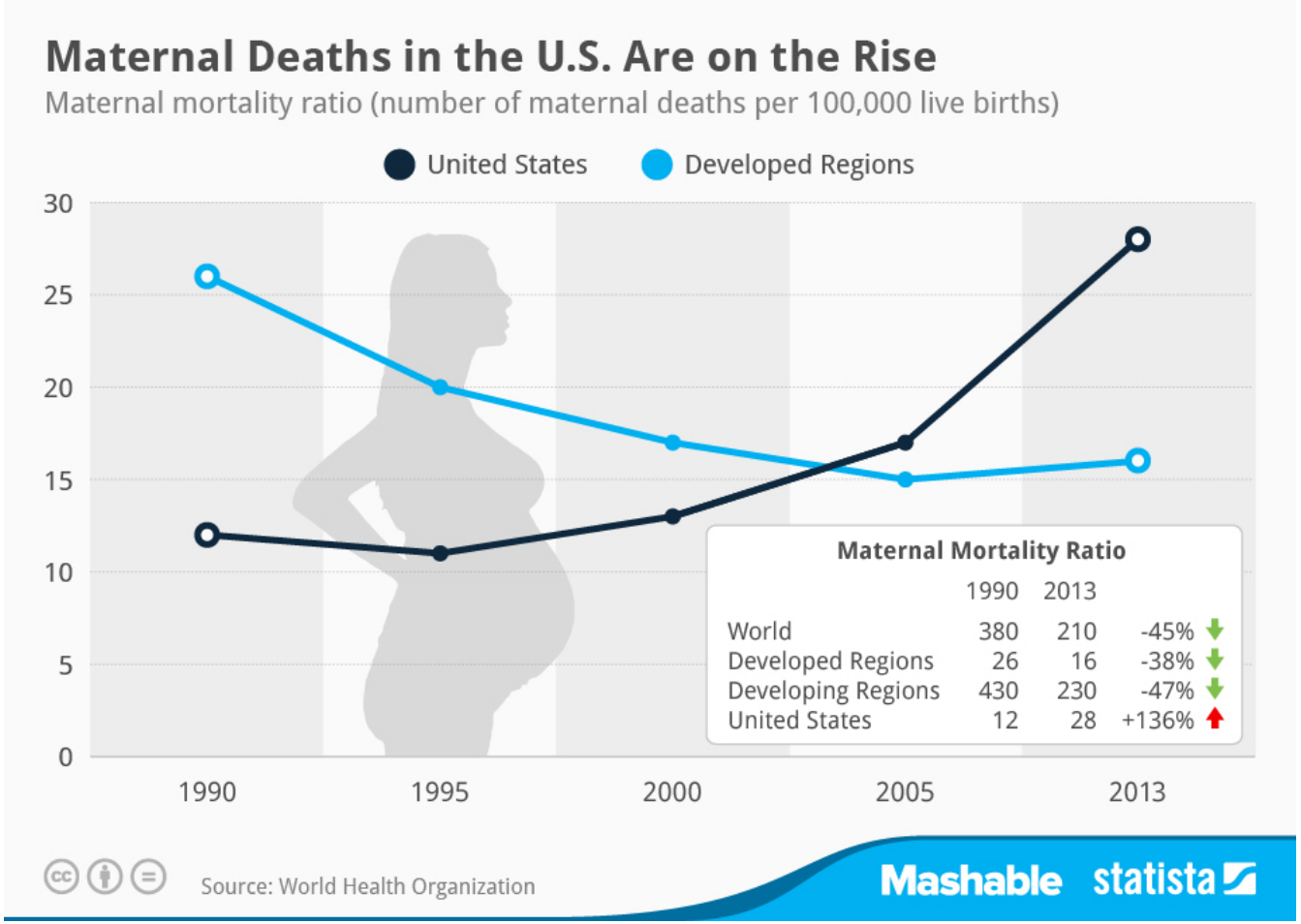
Stephen K. Hunter, MD., PhD.
Professor & Vice Chair for Obstetrics
Department of OB/GYN
University of Iowa Hospitals & Clinics
C0-Director: Iowa Statewide Perinatal Care Program
Iowa Department of Public Health

Apollo 1 video clip

Just another day in Labor & Delivery….

Until it isn’t

US Maternal Mortality



CNN Opinion + Live TV

Maternal mortality is the shar
care

By Christy Turlington Burns

Updated at 9:41 PM ET, Sat November 18, 2017

npr

lost mothers: maternal mortality in the u.s.

U.S. Has The Worst Rate Of Maternal

RESEARCH

U.S. Ranks Worst Developed Country for Maternal Health

The

WORLD ECONOMIC FORUM

Materna
Defying

By Sabrina Tave

Sept. 21, 2016

The US has the highest maternal mortality rate in the developed world. Why?

Why is the United States' Maternal Death Rate so High?

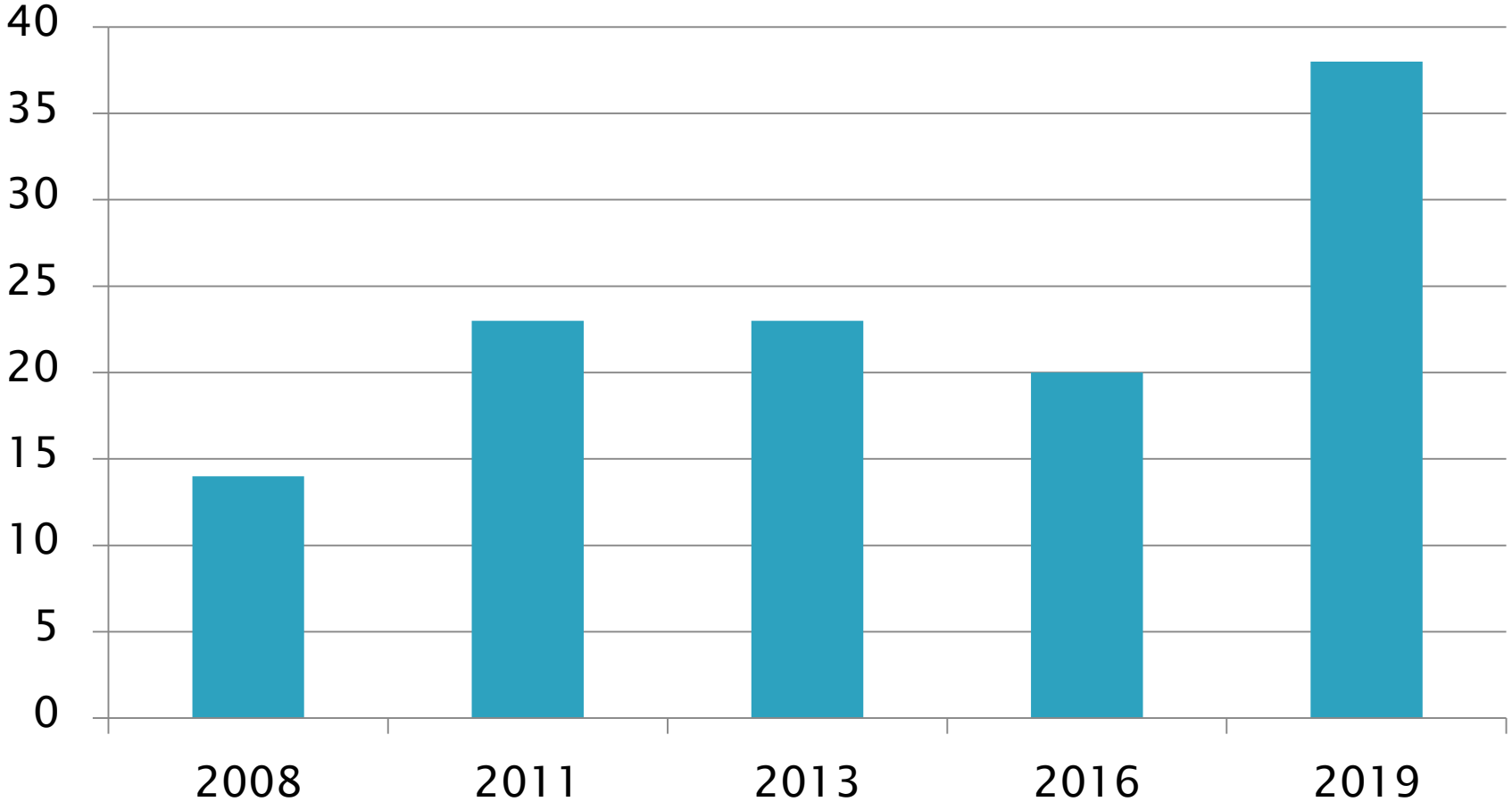
Written by Kimberly Holland on June 6, 2017

Lessons Learned from Reviews

- **Hemorrhagic death**
  - 93% of all deaths were potentially preventable
  - Lack of appropriate attention to clinical signs of hemorrhage
  - Failure to restore blood volume, to act decisively with life saving interventions
- **Severe Hypertension**
  - 60% of maternal deaths were potentially preventable
  - Failure to control blood pressure, to recognize HELLP syndrome, to diagnose and treat pulmonary edema
- **Pulmonary Embolism**
  - "single cause of death most amenable to reduction by systematic change in practice"
  - Failure to use adequate prophylaxis

Berg CJ et al. Obstet Gynecol 2005
Cantwell R. et al. BJOG 2011
Clarck SL. Semin Perinatol 2012

Iowa Maternal Deaths

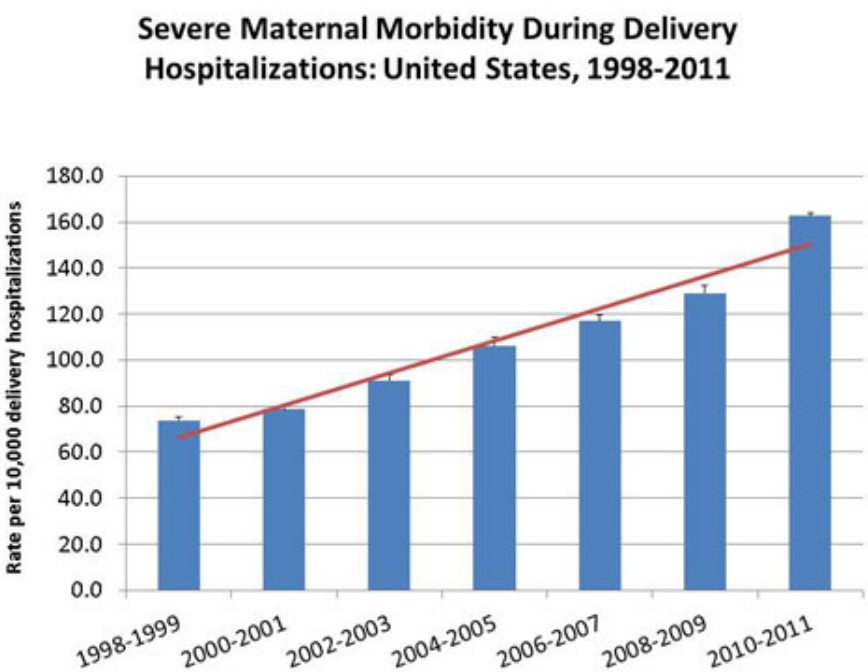


The Burden of Maternal Morbidity

- Reviewed Nationwide Inpatient Sample (ICD-9) for 1998-2009
- Severe morbidity 12.9 per 1000 deliveries
  - Increased by 75% and 114% for delivery and postpartum from 1998/99 to 2008/9
  - Increase in shock, ARF, PE, RDS, Acute MI, blood transfusion, aneurysm, cardiac surgery
- Overall mortality in postpartum period increased by 66%
- Impacts >50,000 women each year

Callaghan WM et al. Obstet Gynaecol 2012

U.S. Rates of Severe Maternal Morbidity



- Rates of SMM in the United States steadily increased from **73.82** in 1998–1999 to **162.76** in 2010–2011.

“There are some patients we cannot help;
there are none we cannot harm.”

Arthur Bloomfield, MD

“Medicine used to be simple, ineffective and relatively safe. Now it is complex, effective and potentially dangerous.”

Cyril Chantler, MD, Lancet, 2001

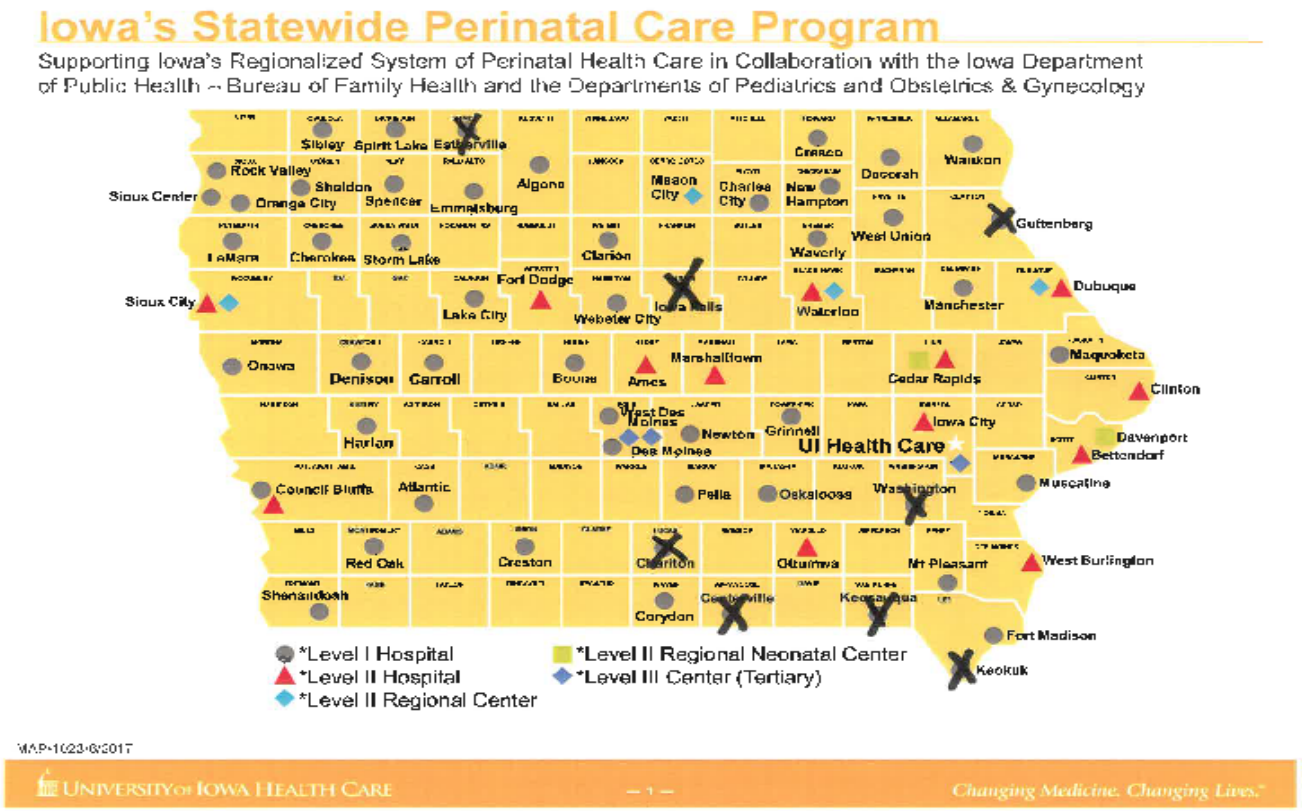
“…modern health care is the most complex activity ever undertaken by human beings.” *Ken Kizer*

- Highly complicated technologies
- Panoply of powerful drugs
- Widely differing professional backgrounds
- Unclear lines of authority
- Highly variable physical settings
- Unique combinations of diverse patients
- Communication barriers
- Care processes widely vary
- Time pressured environment

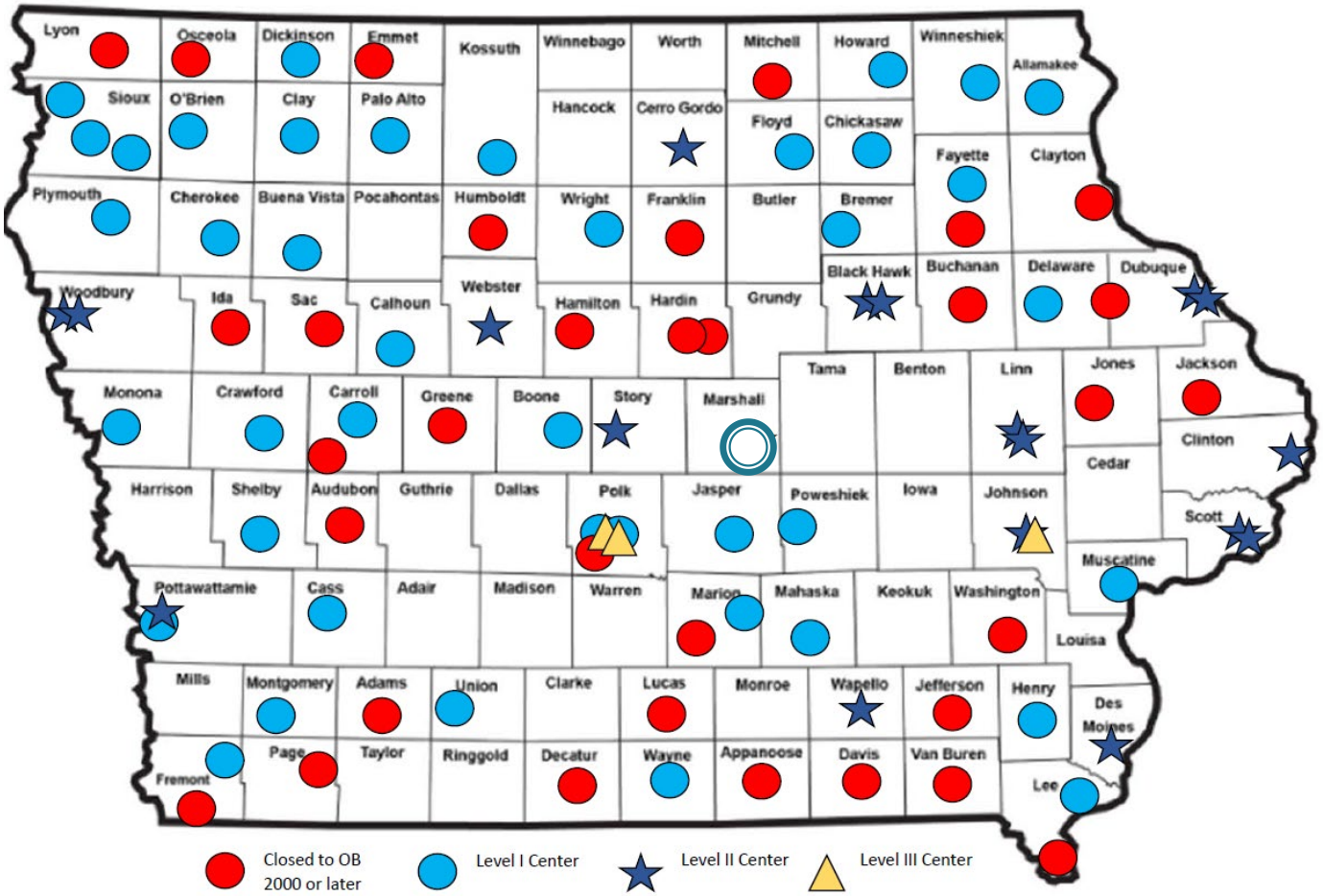
Health Challenges – During Pregnancy and Labor & Delivery

- Hospital Closures

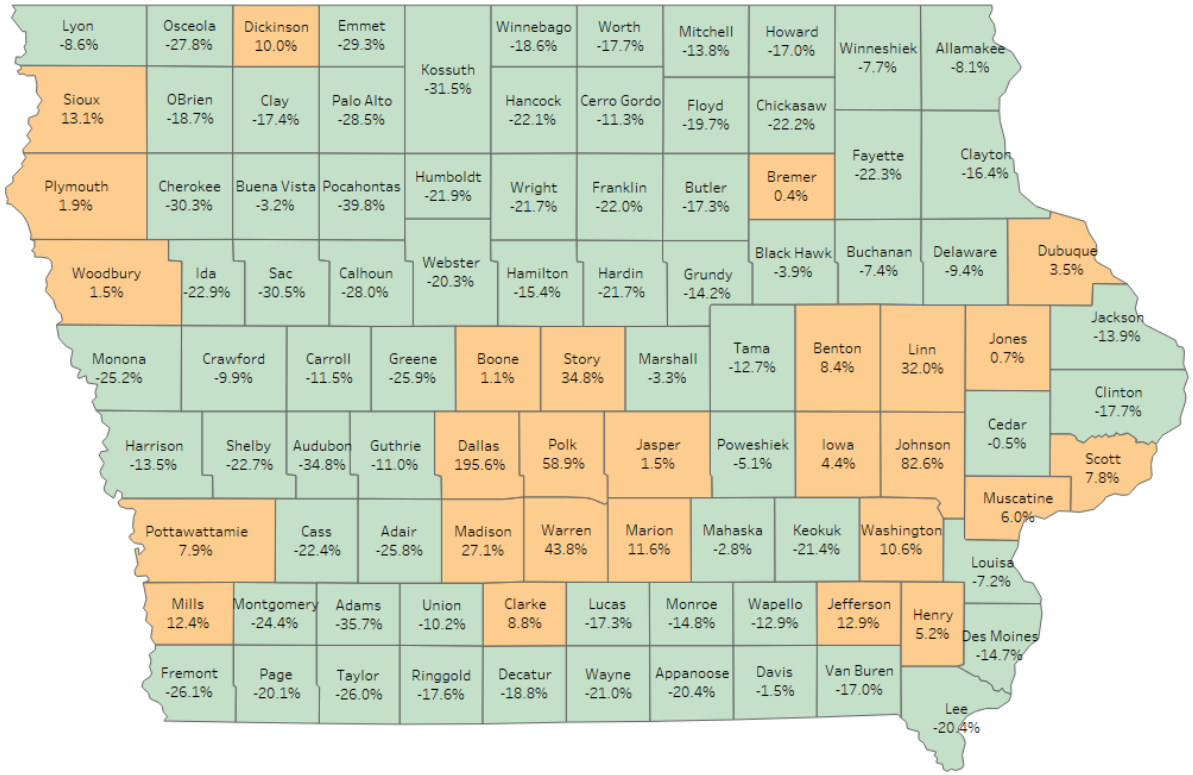
L&D closures in 2018



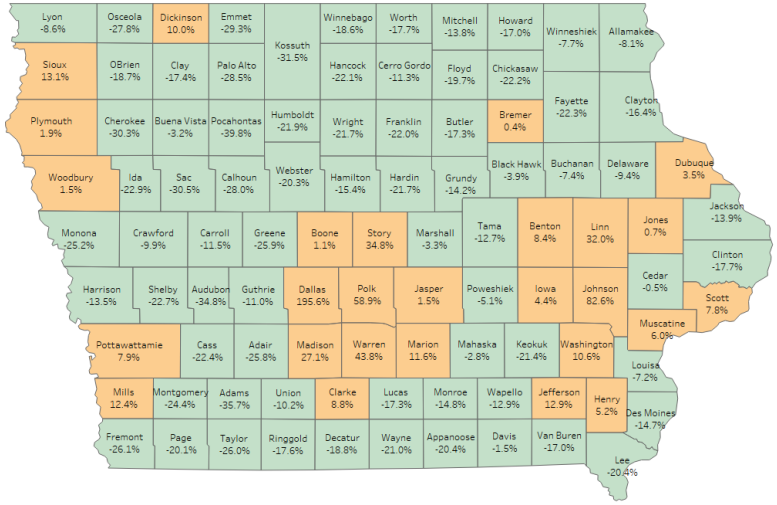
Hospitals with maternity services by county/level of care and hospitals with maternity unit closures, 2000 – 2018



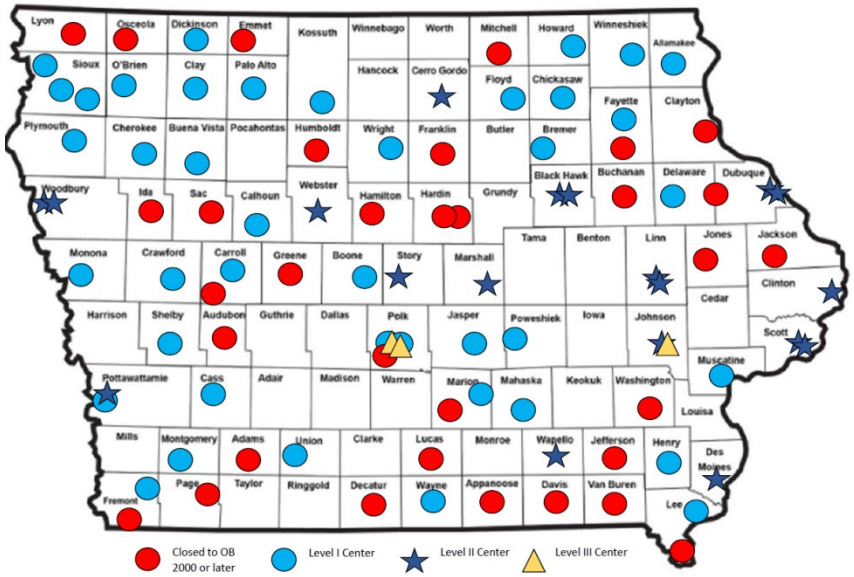
Iowa Population Changes by County Since 1980



Data Source: U.S. Census Bureau, 1980 Census and 2017 Annual Population Estimates



Data Source: U.S. Census Bureau, 1980 Census and 2017 Annual Population Estimates



Reasons for Rural Iowa Hospital Obstetrical Service Closures

- A single page, six question survey was mailed to the CEO's of all 93 Level one hospitals in the state of Iowa (51 offering perinatal services and 42 did not offer these services at the time of the survey).

Reasons cited for closure of obstetrical units

	Reason	Number of Responses
1	Inability to recruit physicians willing or able to provide OB care	18
2	Inability to retain physicians willing or able to provide OB care	14
3	Inability to recruit physicians capable of performing Cesarean sections	9
4	Inability to retain physicians capable of performing Cesarean sections	7
5	Inability to recruit physicians to provide OB anesthesia	7
6	Inability to retain physicians to provide OB anesthesia	5
7	Inability to recruit nurses trained in providing OB care	6
8	Inability to retain nurses trained in providing OB care	8
9	Concerns regarding quality of OB care	17
10	Medical legal concerns	14
11	Financial non-profitability	11
12	Low volume of patients	10

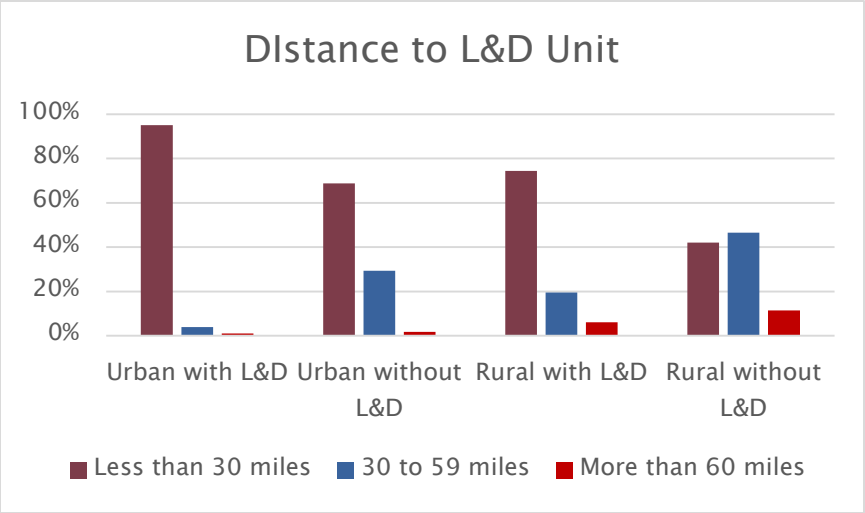
Associations Between Loss of Hospital-Based Obstetric Services and Birth Outcomes in Rural Counties

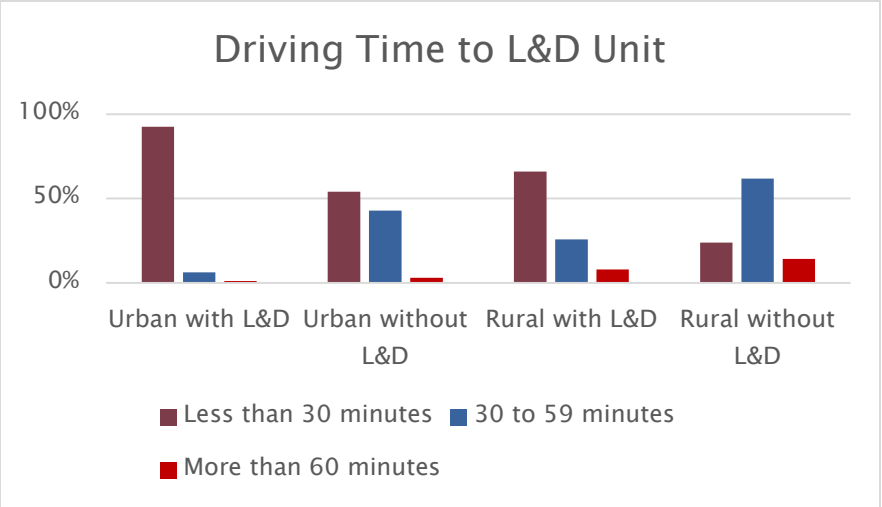
- Increased neonatal mortality rates?
- Increased premature delivery rates?
- Decreased outpatient prenatal care use?
- Increased out-of-hospital births?

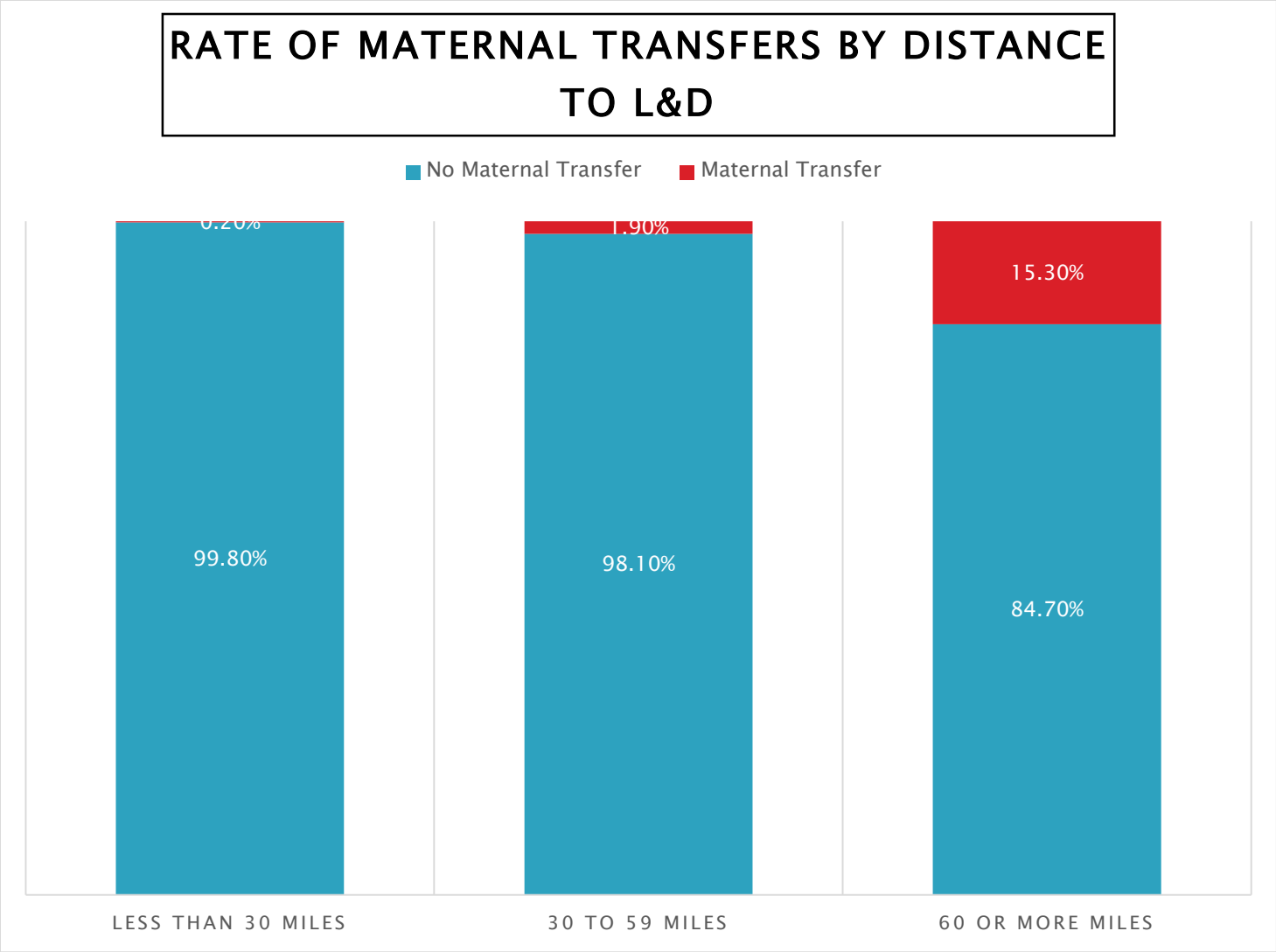
Increase in poor outcomes = increase cost to society

CDC Data Brief, Sept 2017
Kozhimannil, KB., et al JAMA 2018; 319(12)

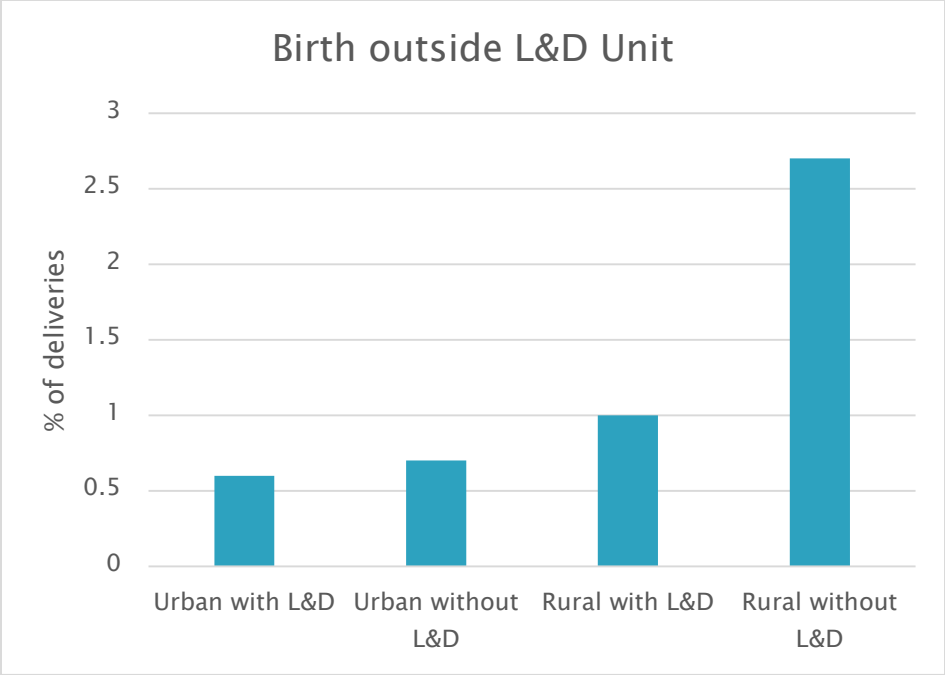
Access to L&D Care Logistics

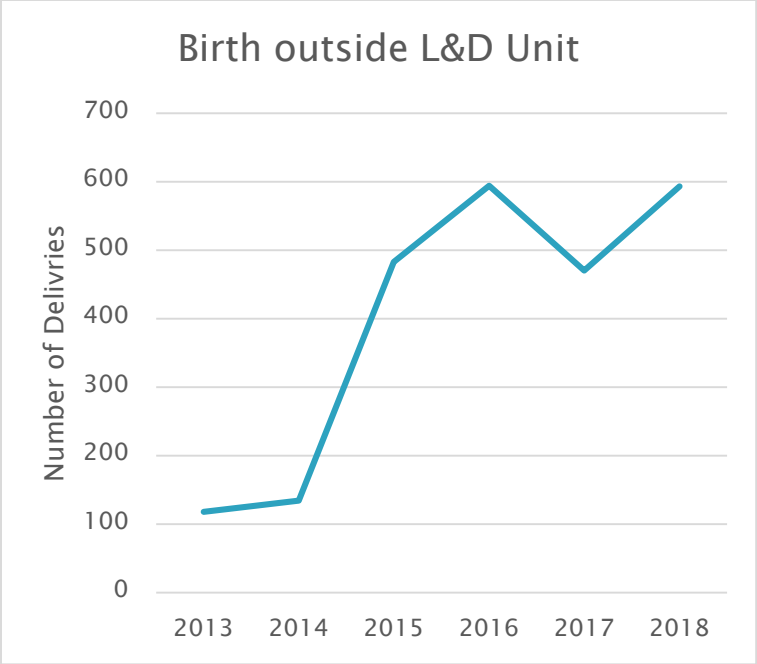





RATE OF MATERNAL TRANSFERS BY DISTANCE TO L&D
No Maternal Transfer
Maternal Transfer
0.20%
99.80%
1.90%
98.10%
15.30%
84.70%
LESS THAN 30 MILES
30 TO 59 MILES
60 OR MORE MILES

Unintended out-of-hospital Births



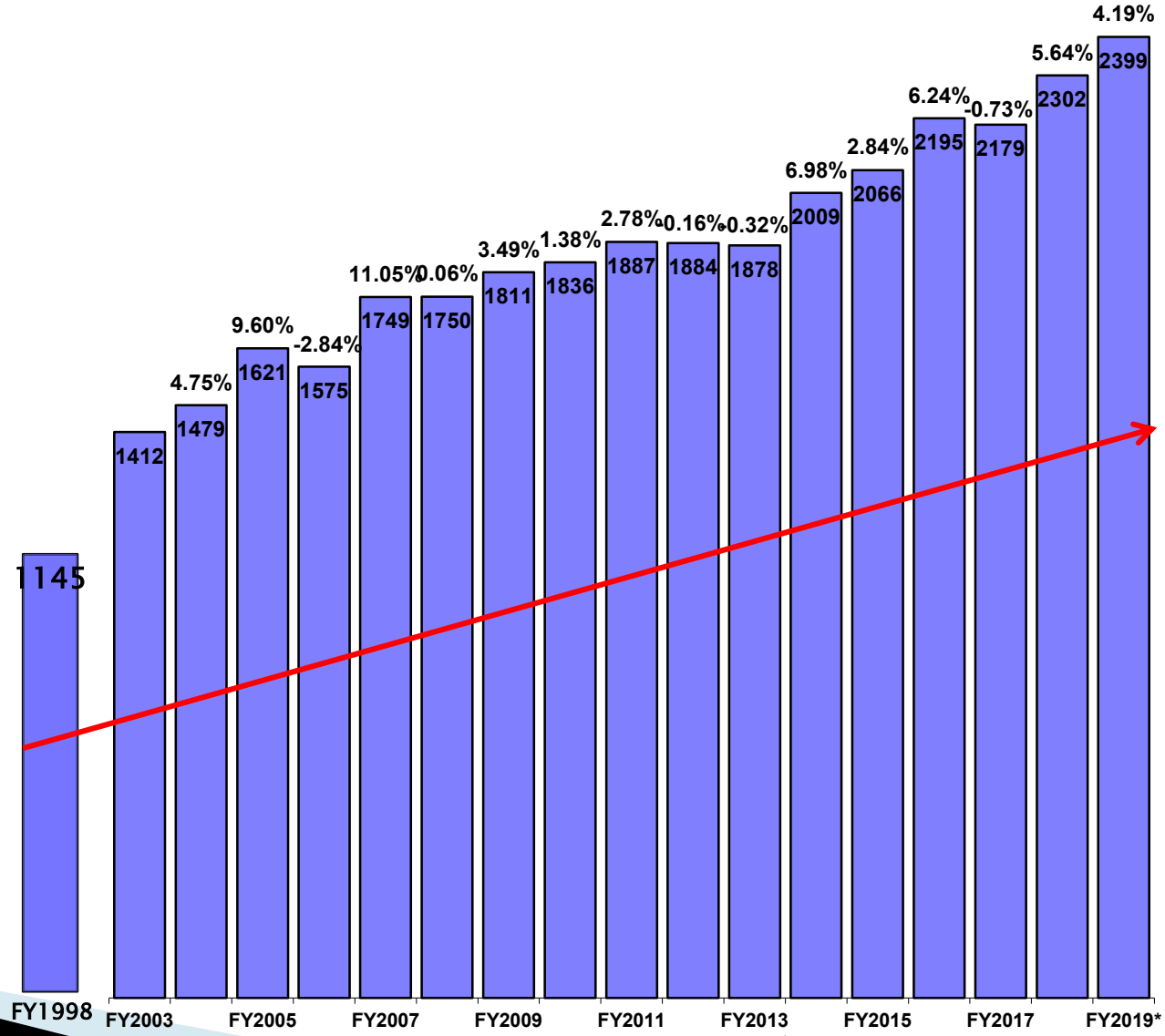


Increasing and ? Overwhelming Open L&D Units; Total UIHC Deliveries per Fiscal Year

Deliveries are on the rise and are projected to increase

There were 2349 births with 2446 babies born at UIHC last fiscal year

Average of 3.4% growth per year



*Projection based upon LD trend data Jul

Health Challenges – During Pregnancy and Labor & Delivery

- Hospital Closures
- **Increasing patient acuity & Maintaining staff competencies**
  - **Advanced maternal age**
  - **Obesity**
    - **High Blood Pressure**
    - **Diabetes**
    - **Vascular disease**
  - **Cardiac Disease**

Increasing Patient Acuity: Are We Prepared?

- **Not Just Birthing Babies**

  Labor and Delivery is a complex unit which involves a patient we can see and an "unseen" patient. It is a combination of Emergency Room, Operating Room, Intensive Care Unit and OB.

OB Changes (taken from Guidelines for Professional Registered Nurse Staffing for Perinatal Units)

- Increase in medical interventions, elective procedures, prevalence of morbid obesity, women of advanced maternal age with associated medical complications, women with comorbidities, women presenting for obstetric triage, antenatal testing techniques, labor inductions, preterm births, multiple gestations, cesarean births, and requirements for maternal and fetal assessments
- More women with social and economic disadvantages, drug and alcohol abuse, and language barriers
- Addition of pharmacologic agents for cervical ripening and labor inductions

Guidelines for Professional Registered Nurse Staffing for Perinatal Units, AWHONN, 2010

National OB Changes, cont.

- Designation of oxytocin and magnesium sulfate as high alert medications
- Increase in births of late preterm infants and early term infants who require closer monitoring as they are at higher risk for complications than term babies
- Advances in neonatology allowing care for more fragile preterm babies
- Decreased lengths of inpatient stay for childbirth resulting in higher acuity for moms and babies

Guidelines for Professional Registered Nurse Staffing for Perinatal Units, AWHONN, 2010

National OB Changes, Cont.

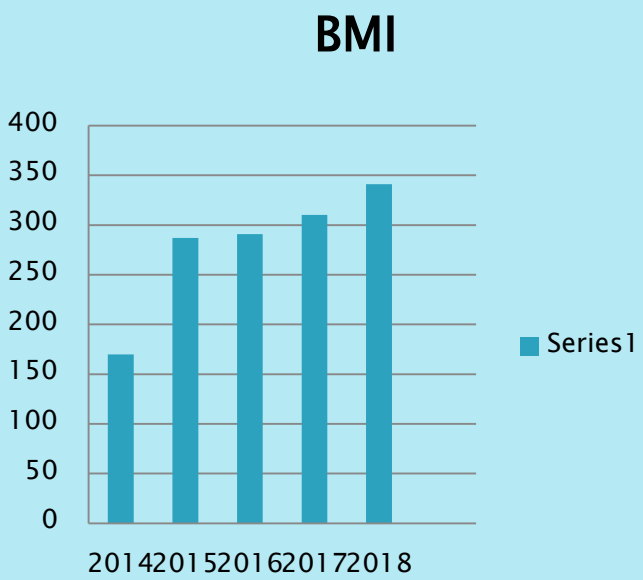
- Proliferation of electronic medical records systems that require more nursing time
- Increases in patient data required to be part of the medical record based on regulatory and accreditation standards, including admission screening for multiple non-obstetric conditions, social and health risks, medication reconciliation, discharge processes, checklists, and double check systems for patient safety

Guidelines for Professional Registered Nurse Staffing for Perinatal Units, AWHONN, 2010

INCREASE IN PATIENTS WITH BMI OVER 40

TRANSFERS FROM OUTSIDE HOSPITALS

Level 1, 2 and some level 3 hospitals no longer deliver moms with large BMI, but instead transfer them to deliver with the expert care and resources that higher level of care hospitals have to offer.

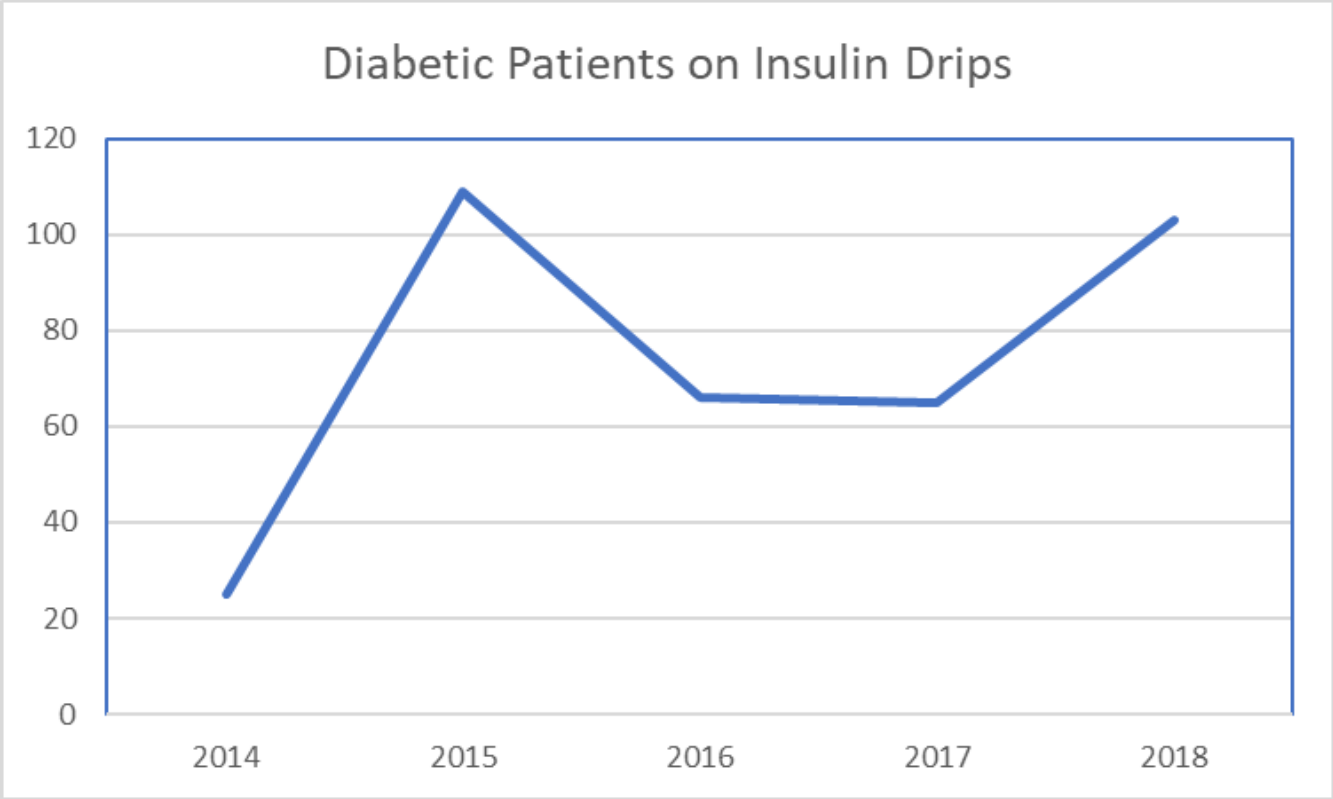


COMPLICATIONS

Patients with High BMI have higher rates of gestational diabetes, preeclampsia, fatty liver disease, babies with neural tube defects and other birth defects, stillbirth (40% increase), preterm birth, macrosomic infants, increased rates of Cesarean section, wound separation, wound infections, and blood clots.

ACOG, FAQ182, April 2016

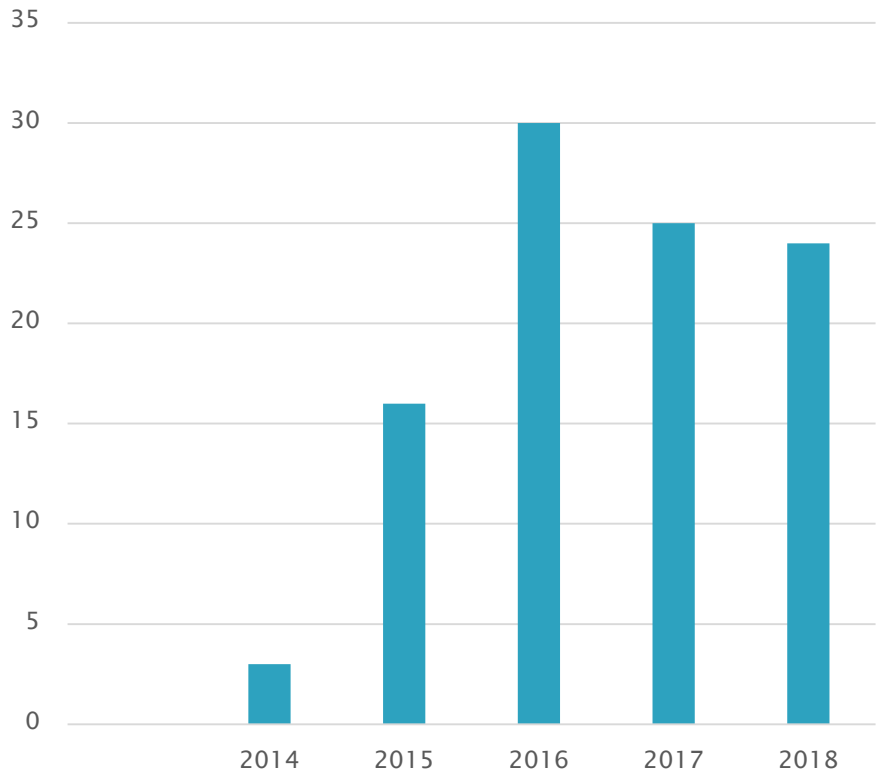
Diabetic Patients on Insulin Drips



This does not include patients who are diabetic but diet controlled.

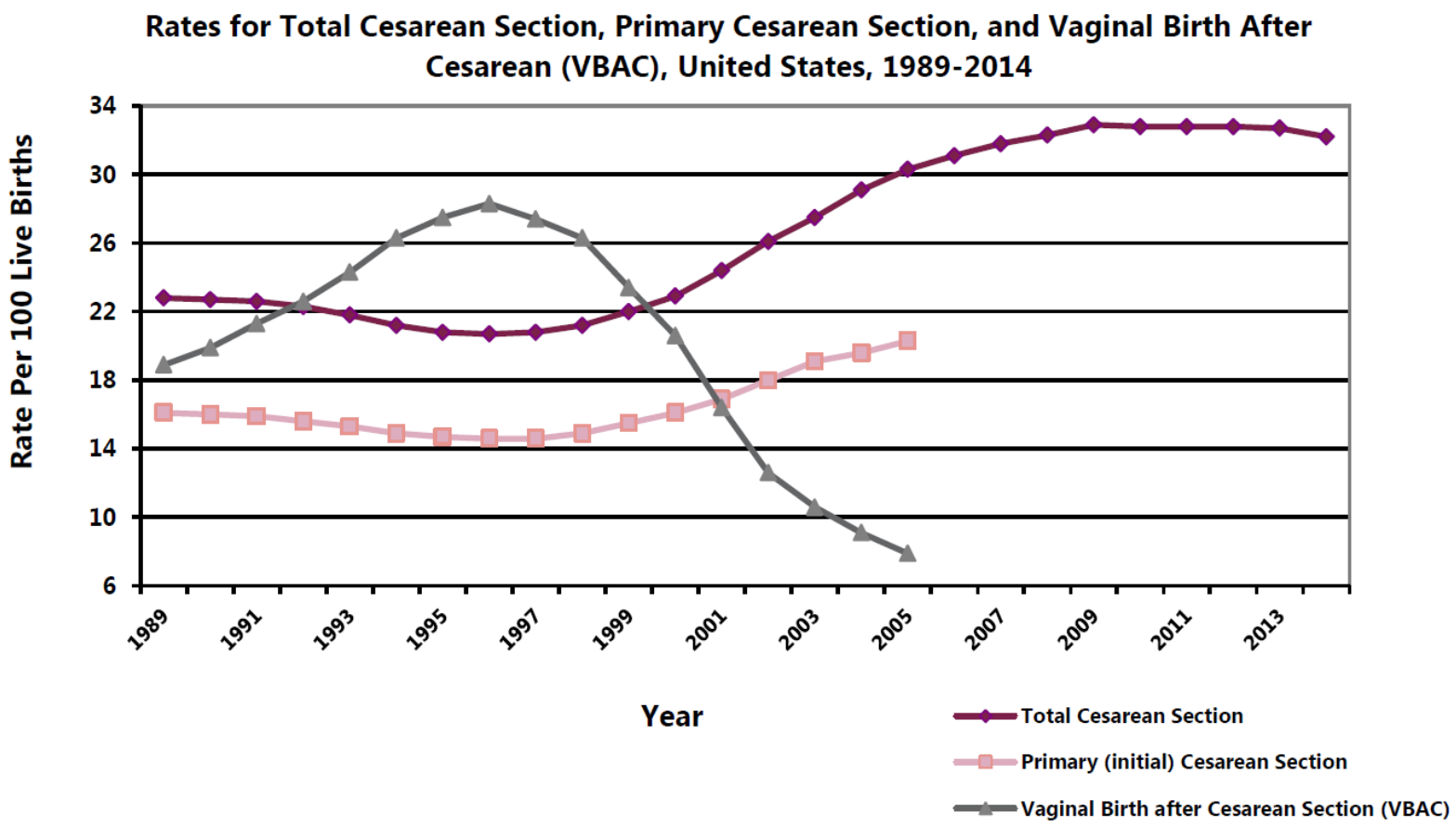
Patients Admitted to ICU from Labor and Delivery

2014	3
2015	16
2016	30
2017	25
2018	24



HEMORRHAGE IS ALSO ON THE RISE

- Currently, 19% of our patients overall are having a postpartum hemorrhage, which if divided by delivery type, 26% of C-sections moms, and 15% of vaginal deliveries have a hemorrhage. With 2302 deliveries in 2018, this would equate to 437 hemorrhages last year.


Rates for Total Cesarean Section, Primary Cesarean Section, and Vaginal Birth After Cesarean (VBAC), United States, 1989-2014
Rate Per 100 Live Births
34
30
26
22
18
14
10
6
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Year
Total Cesarean Section
Primary (initial) Cesarean Section
Vaginal Birth after Cesarean Section (VBAC)

Attempts at vaginal delivery after one or more cesarean sections

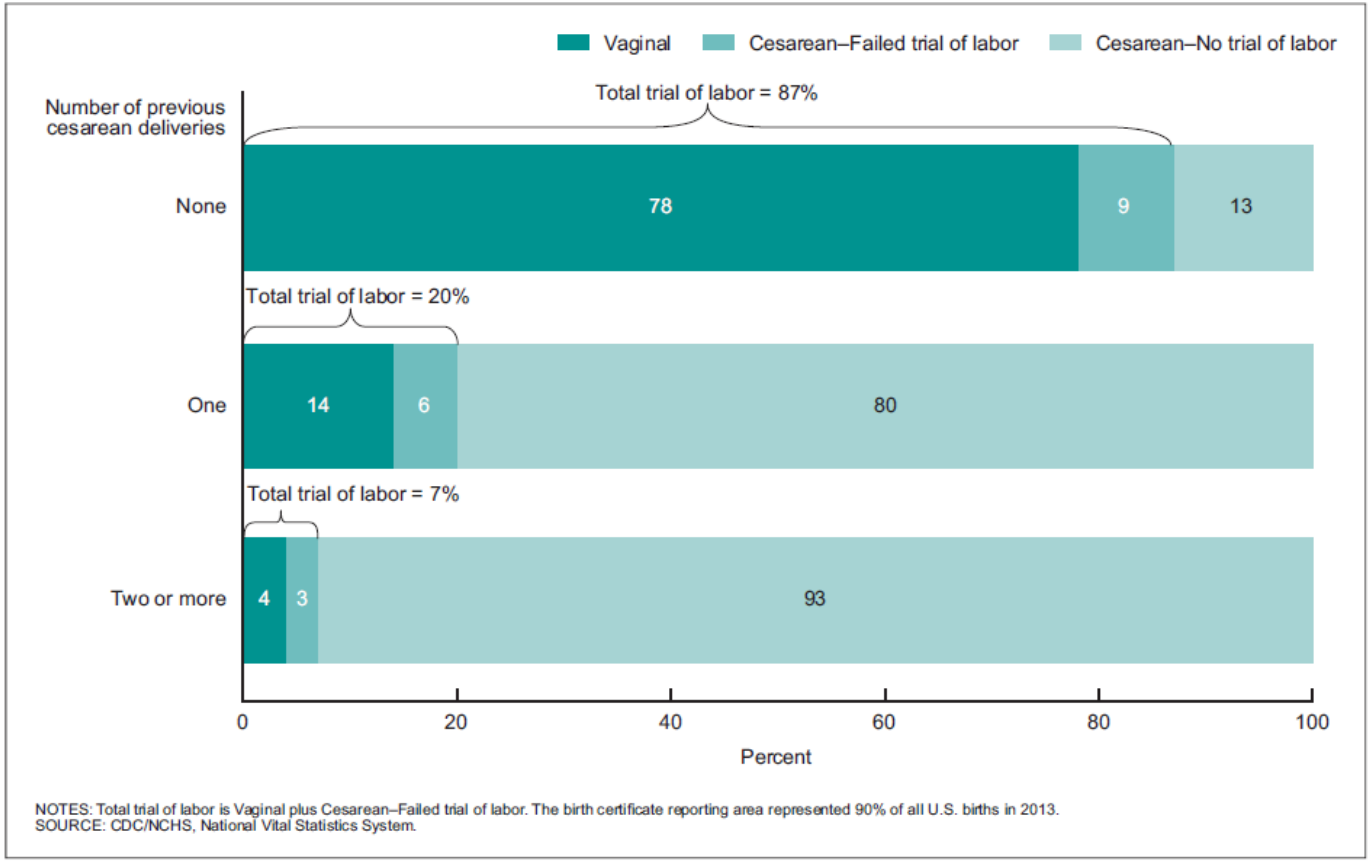


Figure 2. Trial of labor and method of delivery, by number of previous cesarean deliveries: 41-state and District of Columbia reporting area, 2013

Maternal Morbidity by route of delivery

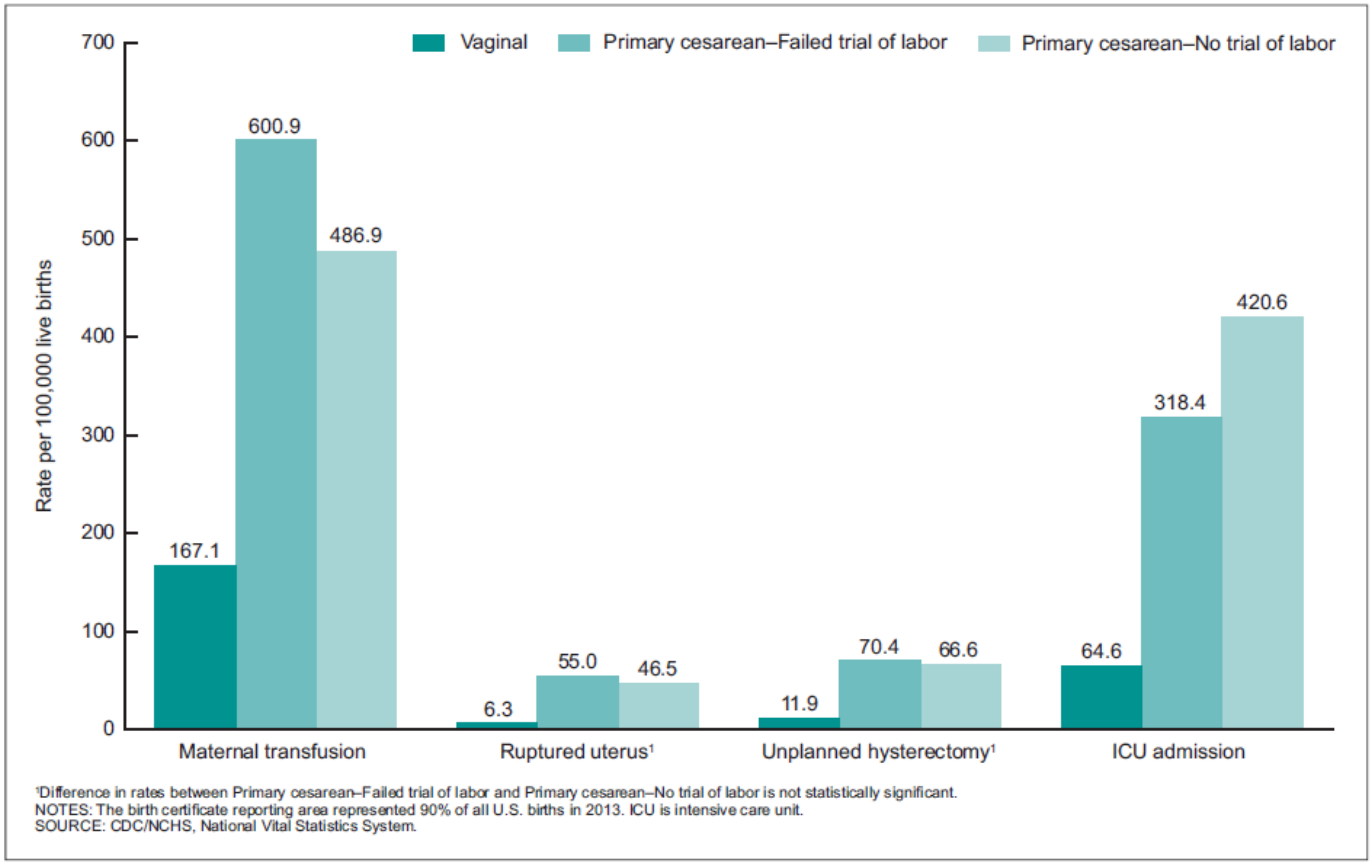


Figure 3. Maternal morbidity for women with no previous cesarean delivery, by method of delivery and trial of labor: 41-state and District of Columbia reporting area, 2013

Maternal Morbidity by route of delivery

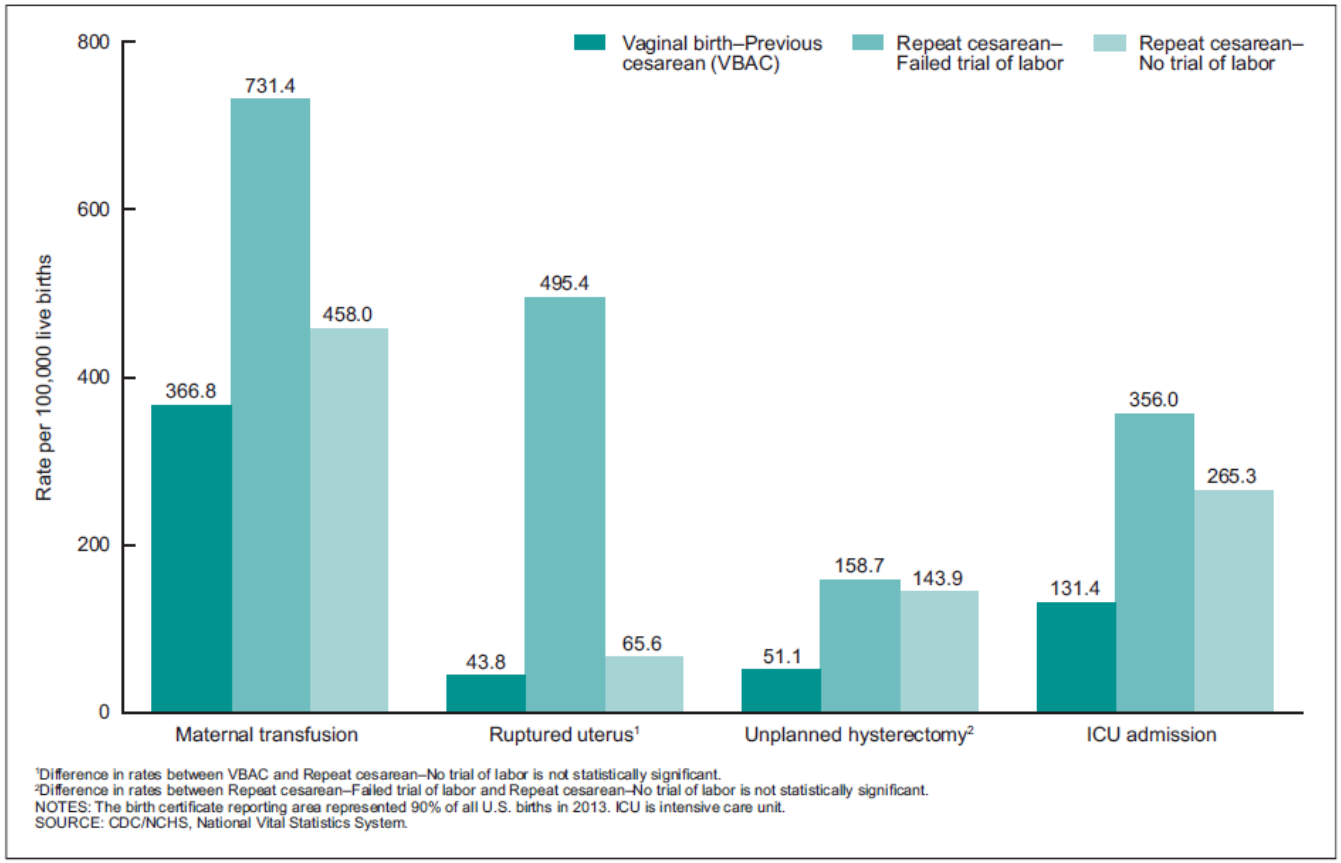
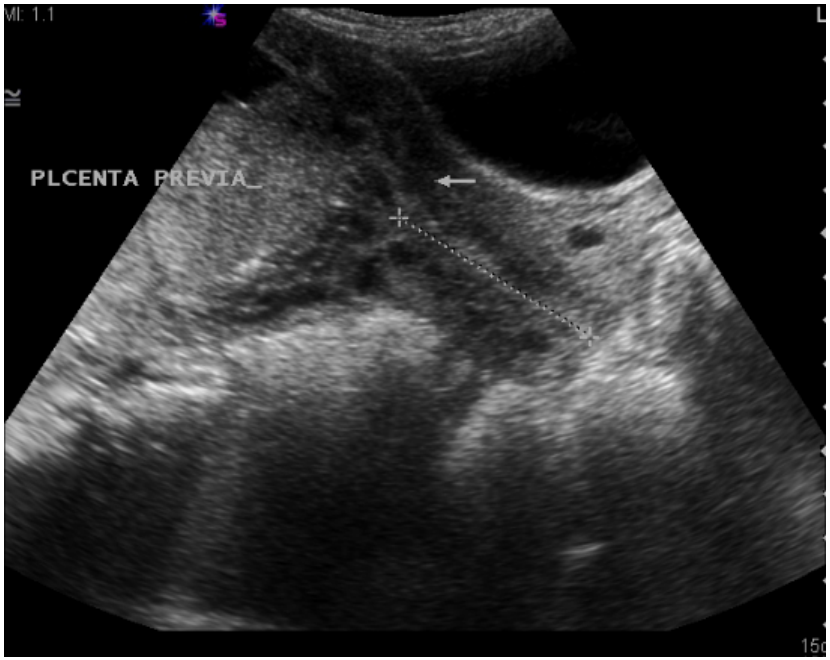


Figure 4. Maternal morbidity for women with a previous cesarean delivery, by method of delivery and trial of labor: 41-state and District of Columbia reporting area, 2013

Cesarean Section Birth; Risks to the Mother

- Cesarean 1st birth is associated with a higher risk of:
  - Placenta previa
  - Placental abruption
  - Uterine scar dehiscence
  - Uterine rupture in the 2nd pregnancy

  Getahun et al. 2006, Gillian 2006, Lydon-Rochelle 2001



- There is a dose-response pattern in the risk of placenta previa, with increasing numbers of previous Cesareans increasing the risk
- *Getahun et al. 2006*

Placenta Previa and Placenta Accreta Syndrome *by Number of Cesareans*

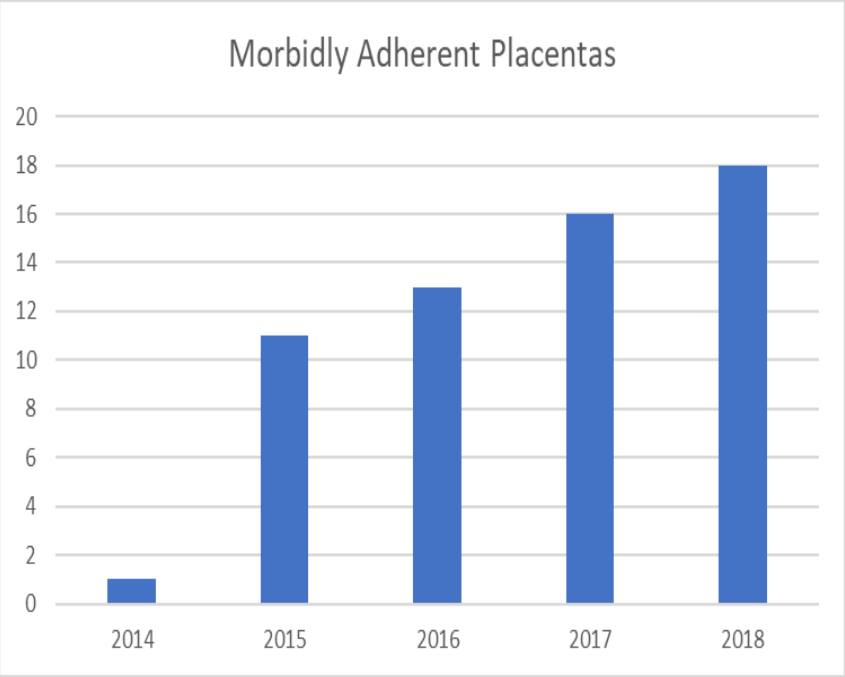
In the 723 women with placenta previa…

Cesarean	↑ *Risk for Accreta*
1st	3%
2nd	11%
3rd	40%
4th	61%
≥5th	67%

Obstet Gynecol June 2006;107:1226-32

Placenta Accreta Spectrum

Total Morbidly Adherent Placentas			
2014	1		
2015	11		
2016	13		
2017	16		
2018	18		



Iowa Cesarean Section Rates by Hospital Level

- Percent of deliveries by C-section overall
  - Level 1: 15.9 – 50%
  - Level II: 17.5 – 41.3%
  - Level III: 31.5 – 34.3%
  -
- Percent of primary C-sections
  - Level 1: 7.8 – 38.5%
  - Level II: 8.8 – 22.8%
  - Level III: 18.7 – 19.8%
- Percent of C-sections among nulliparous mothers with singleton infants >= 37 weeks gestation
  - Level 1: 5.9 – 63.6%
  - Level II: 15.3 – 37.8%
  - Level III: 22.6 – 25.8%

The most effective approach to reducing overall morbidities related to cesarean delivery is to avoid the first cesarean delivery.

Type of Physicians Performing Cesarean Sections at Rural Level 1 Iowa Hospitals

FP only	General Surgery only	FP & GS	OB only	OB & GS	FP & GS & OB	FP & OB
7 (15.9%)	7 (15.9%)	11 (25%)	7 (15.9%)	7 (15.9%)	3 (6.8%)	2 (4.5%)

50% of General Surgeons are older than 50 years

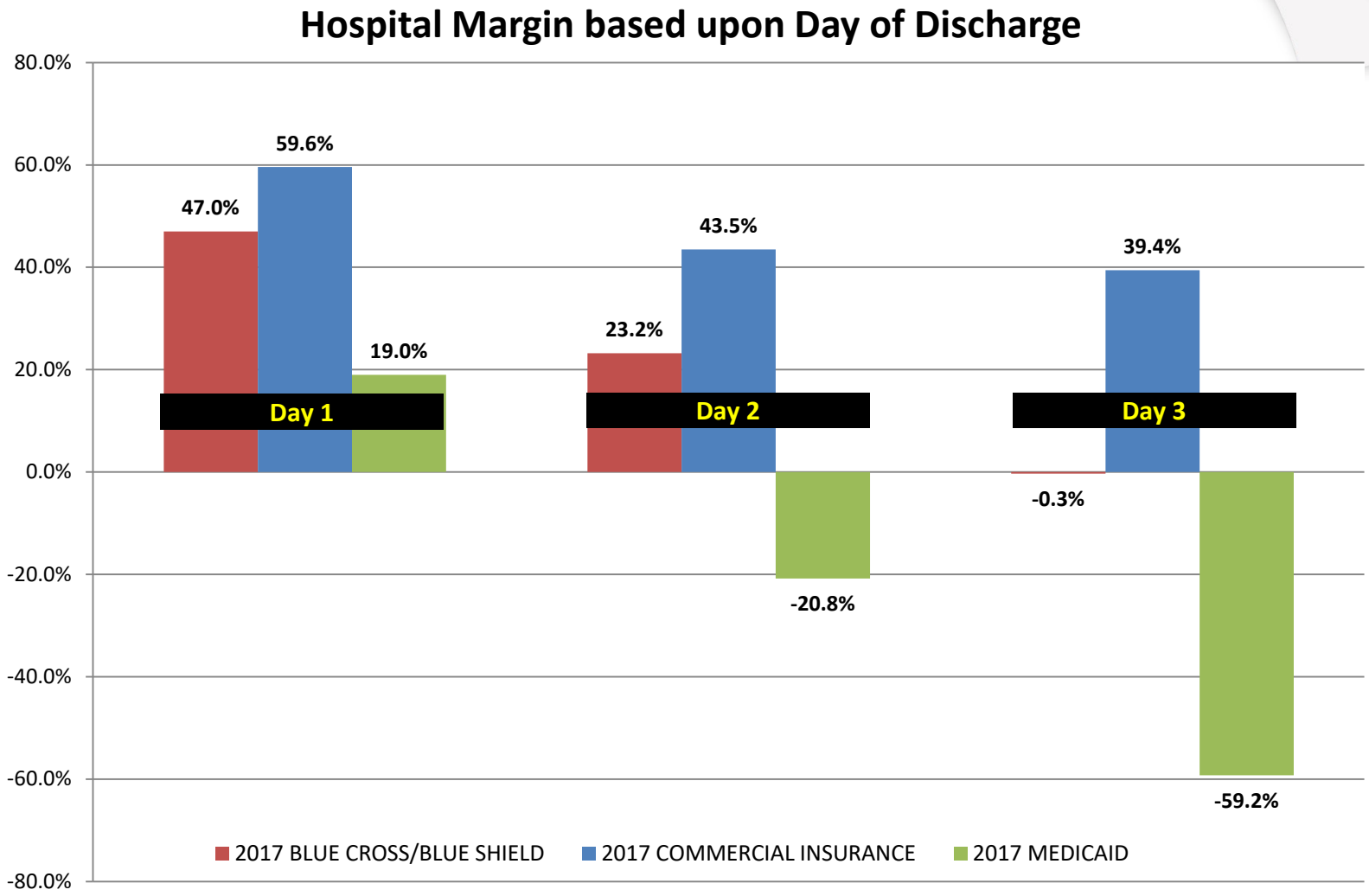
A recent review of reported cases by ACGME general surgery graduates from 2009-2105 highlighted that while residents performed, on average, 1328 cases by the completion of residency, not a single Cesarean section was reported

Health Challenges – During Pregnancy and Labor & Delivery

- Hospital Closures
- Increasing patient acuity & maintaining staff Competencies
  - Advanced maternal age
  - Obesity
    - High Blood Pressure
    - Diabetes
    - Vascular disease
  - Cardiac Disease
- **Financial Concerns**

Challenges to providing Obstetrical Care

CHANGING MEDICINE.
CHANGING LIVES.®



Margin is Payments less variable costs (excludes Facility Overhead)

Challenges to providing Obstetrical Care

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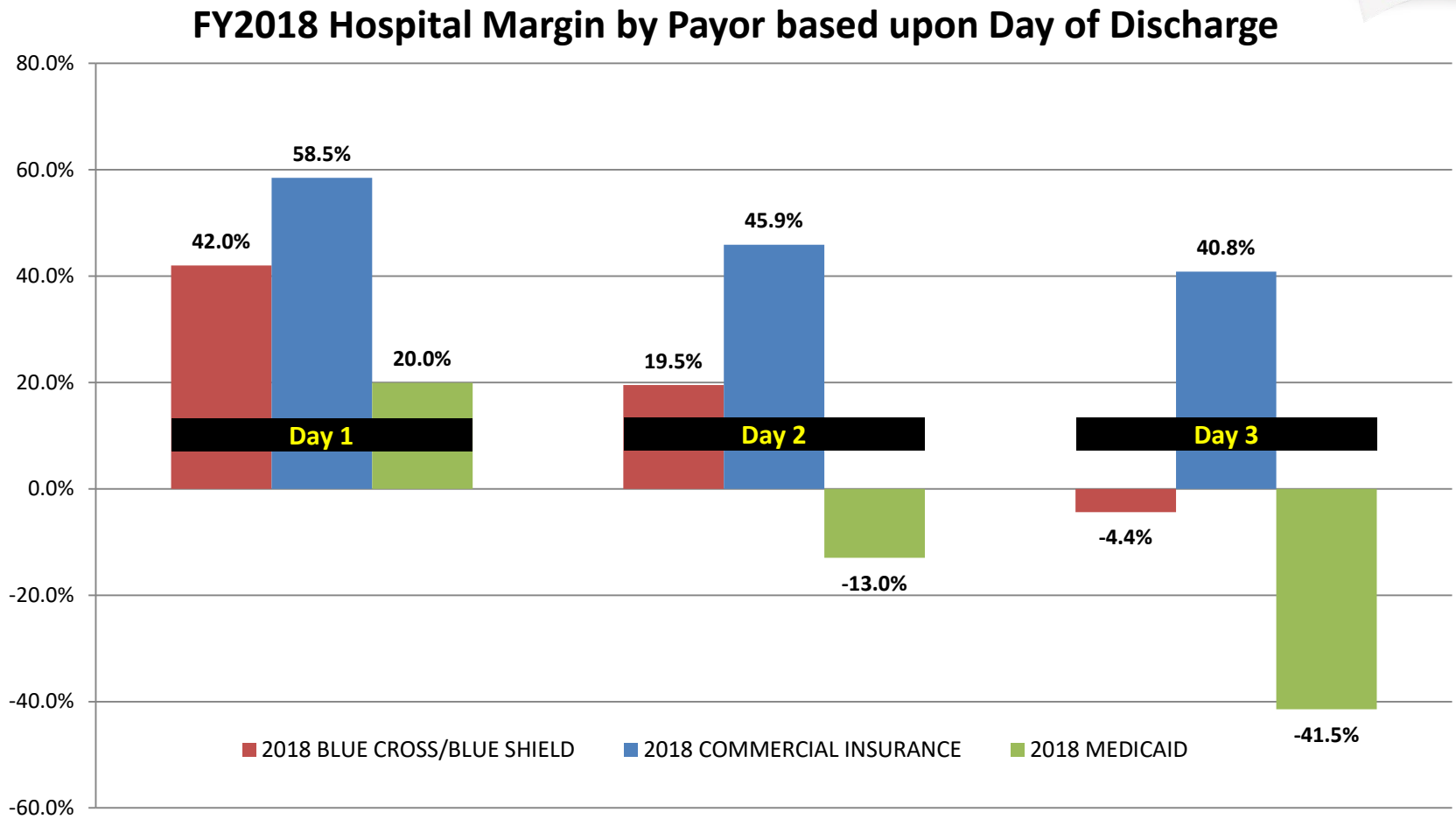

Margin is Payments less variable costs (excludes Facility Overhead)

Health Challenges – During Pregnancy and Labor & Delivery

- Hospital Closures
- Increasing Patient Acuity & maintaining staff Competencies
  - Advanced maternal age
  - Obesity
    - High Blood Pressure
    - Diabetes
    - Vascular disease
  - Cardiac Disease
- Financial Concerns
- **Threats to our state's regionalization of perinatal care: Regionalization vs. With-in Network**

Iowa's regionalized system of perinatal Care

- Corporate buyout of hospitals and healthcare systems
  - Does this affect transfers?
    - Neonatal example
  - Education?
    - With respect to continuing educational opportunities, 14 of 46 (30.5%) Level I hospitals have a written agreement in place to obtain educational programs from a higher level hospital. The other 32 respondent hospitals (69.5%) either have no agreement in place regarding educational opportunities or are unsure if an agreement exists.
    - It is the obligation of a parent corporation to provide education to their Level I and Level II referring hospitals. While these entities often dictate protocols regarding patient care, this should not be equated with continuing education.

What Can Hospitals Do Now To Improve Labor & Delivery Safety & Quality?

Current System

CLINICAL EVENT

↓

BAD OUTCOME

↓

LITIGATION

↓ ←

MONEY PAID

Desired System

CLINICAL EVENT

↓ ←

BAD OUTCOME

↓

LITIGATION

↓

MONEY PAID

What Can Hospitals Do Now To Improve Safety & Quality?

- Simulation Based Learning

Simulation-based Learning

- a methodology for learning in which trainees
  - are immersed in an environment filled with realistic visual, auditory and tactile cues
  - must integrate cognitive, technical and behavior skills under often intense time pressure
  - are provided the opportunity to reflect on their performance (Debrief)

Video clip

“In about two and a half minutes they will <u>understand</u>…”

What Can Hospitals Do Now To Improve Safety & Quality?

- Simulation Based Learning
- Institute Levels of Maternal Care (LoMC) Program in All Iowa Hospitals
  - Improve Maternal Transport System
  - Changes in Referral Patterns, from with-in Network back to geographic

Why change the levels now?
ACOG/SMFM Obstetric Care Consensus February 2015, Revised 2019

- Established Levels of Maternal Care to achieve the following outcomes:
  - Standardized definitions and nomenclature for facilities that provide each level of maternal care.
  - Consistent guidelines according to each level of maternal care for use in quality improvement and health promotion.
  - Equitable geographic distribution of full-service maternal care facilities and systems that promote proactive integration of risk-appropriate antepartum, intrapartum, and postpartum services.
  - Uniform designations for levels of maternal care that are complementary but distinct from levels of neonatal care.

Levels of maternal care. Obstetric Care Consensus No. 2. American College of Obstetricians and Gynecologists and Society for Maternal-Fetal Medicine. Obstet Gynecol 2015;125:502-15. Reaffirmed 2019.

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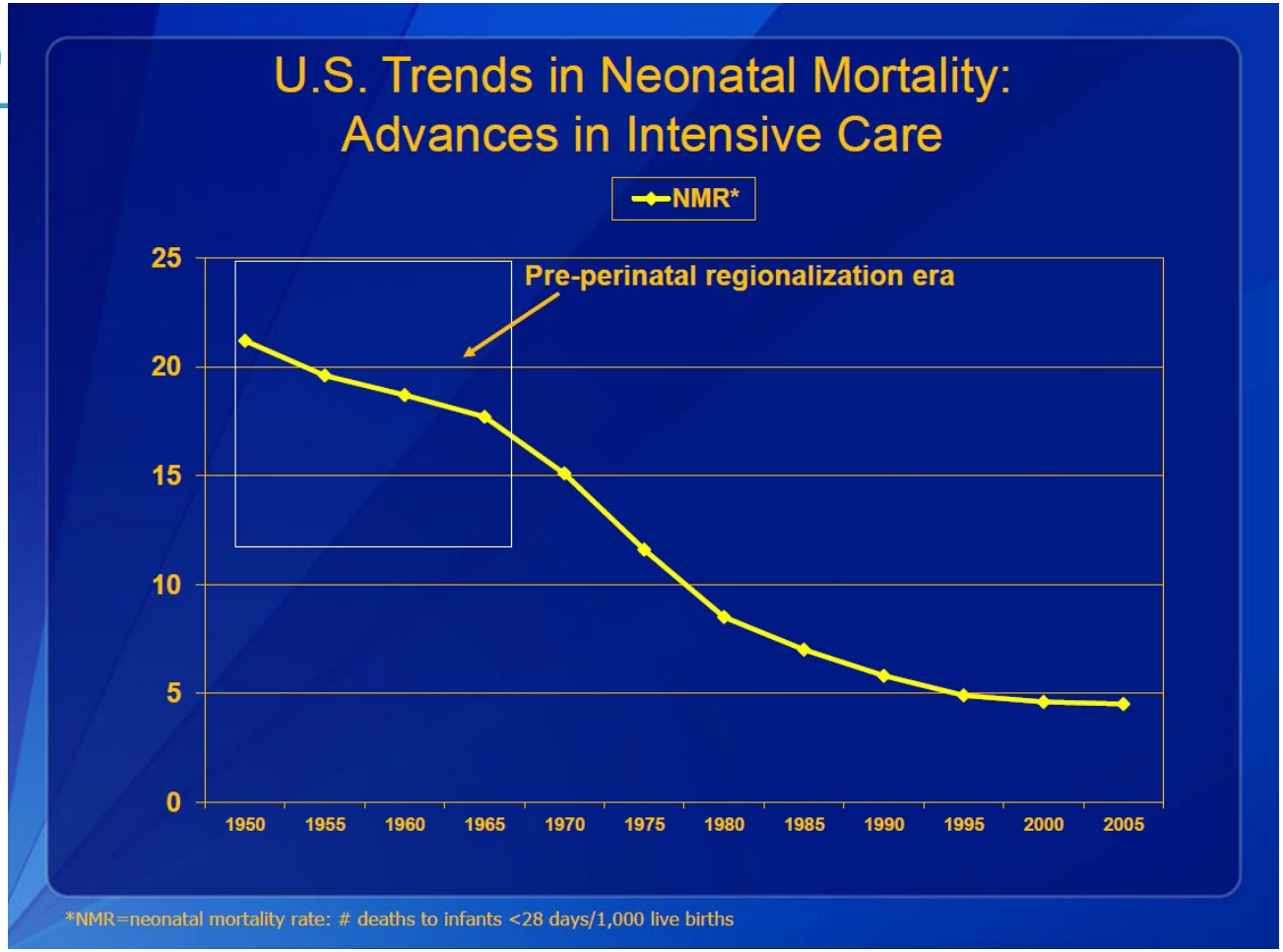

Many studies have shown improved outcomes of critically ill children in higher level centers.

"Facilities that provide hospital care for newborn infants should be classified on the basis of functional capabilities…these facilities should be organized within a regionalized system of perinatal care."

Pediatrics 2012;130:587-597

VLBW infants born at non-level III hospitals had a 62% increase in odds of neonatal or pre-discharge mortality compared with those born at level III hospitals

Experience matters!

Past Medical History / Conditions — Levels of Care

▲ Consider MFM consultation.
■ MFM consultation recommended. (After consultation, select patients may be co-managed.)

Asthma		
Symptomatic on medication		■
Severe (multiple hospitalizations)		■
Maternal cardiac disease		
Cyanotic, prior MI, prosthetic valve		■
AHA Class ≥ II, history of cardiac surgery		■
Congenital heart disease		■
Pulmonary hypertension		■
Other valvar disease		■
Epilepsy (on medication)		■
Family history of genetic problems (e.g., Down Syndrome, Tay Sachs)		■
Hemoglobinopathy (SS, SC, S-thal disease)		■
Hypertension		
Chronic, with renal or heart disease		■
Chronic, on medication	▲	
Prior pulmonary embolus/deep vein thrombosis		■
Psychiatric disease (significant) (e.g., psychoses, schizophrenia, manic-depressive, multiple prescriptions)	▲	
Pulmonary disease		
Severe obstructive pulmonary disease, ARDS		■
Renal disease		
Chronic, creatinine > 1.5 with or without hypertension		■
Chronic, other		■
Prolonged anticoagulation (therapeutic levels)		■
Severe systemic disease (e.g., SLE, hyperthyroidism)		■
Marfan's syndrome or other major connective tissue disease		■
Hypercoagulable state (e.g., antiphospholipid antibody syndrome, lupus anticoagulant, Leiden Factor V, Prothrombin gene mutation, protein S or C deficiency, AT III deficiency)		■
Hx of intracranial injury (e.g., stroke, A.V. malformation, aneurysm)		■
Maternal spina bifida		■
Gastric bypass	▲	
Class III Obesity (BMI>40)	▲	
Red cell isoimmunization		■

Other History / Conditions — Levels of Care

▲ Consider MFM consultation.
■ MFM consultation recommended. (After consultation, select patients may be co-managed.)

Age > 35 at delivery	▲	
Cesarean delivery, prior classical or vertical	▲	
Prior history of preterm delivery < 37 weeks	▲	
Prior fetal structural or chromosomal abnormality		■
Prior neonatal death		■
Prior stillbirth		■
Prior preterm delivery or preterm PROM		■
Prior low birthweight (<2500 gm)		■
Second trimester pregnancy loss		■
Uterine leiomyomata or malformation	▲	
History of recurrent pregnancy loss	▲	

Examination / Laboratory Findings — Levels of Care

Abnormal serum screen		■
Positive noninvasive prenatal screening		■
Anemia (HCT < 28% unresponsive to iron therapy)		■
HIV		■

Medical Conditions during Pregnancy — Levels of Care

Chronic/active drug / alcohol use	▲	
Pyelonephritis	▲	
DVT / pulmonary embolus		■
Ovarian cyst > 6 cm	▲	
Breast cancer		■
Cancer, other		■

Current Obstetrical History / Conditions — Levels of Care

▲ Consider MFM consultation.
■ MFM consultation recommended. (After consultation, select patients may be co-managed.)

Any ICU admission		■
Proteinuria (≥ 4 gms by 24° urine collection)		■
Blood pressure elevation (diastolic ≥ 90), no proteinuria		■
Preeclampsia < 37 weeks		■
Eclampsia		■
IUGR diagnosis		■
Fetal abnormality suspected by ultrasound		■
Fetal demise	▲	
Gestational diabetes mellitus	▲	
Diabetes (pre-gestational)		■
DKA		■
Herpes, primary outbreak in pregnancy		■
Polyhydramnios by ultrasound (AFI > 25 cm)	▲	
Hyperemesis, persisting beyond first trimester	▲	
Multiple gestation		
≥ 3		■
Twins		
Monoamniotic		■
Conjoined		■
Monochorionic		■
Dichorionic, normal growth	▲	
Discordant		■
Oligohydramnios by ultrasound (AFI < 5 cm)		■
Preterm labor with documented cervical change <34 wks		■
Premature ROM < 34 wks		■
Placenta accreta (diagnosed antepartum)		■
Placenta previa	▲	
Chorioamnionitis < 34 wks	▲	
Major Maternal Co-Morbidities		
Lupus flare		■
Renal failure		■
DVT / PE		■
Thyroid storm		■
Pancreatitis		■
MI		■
Cystic fibrosis		■
Cancer		■
Pulmonary edema		■
Pneumonia		■
Red cell isoimmunization		■

What Can Hospitals Do Now To Improve Safety & Quality?

- Simulation Based Learning
- Institute Levels of Maternal Care (LoMC) Program in All Iowa Hospitals
  - Improve Maternal Transport System
  - Changes in Referral Patterns, from with-in Network back to geographic
- **Develop and Use Maternal Safety Bundles**

So, How Do We Prevent the Preventable?

- The use of checklists and standardization of protocols as well as the use of simulation drills need to be incorporated into both the training and competency maintenance of all personnel who provide OB care.

Standardized Practice

The American College of
Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

COMMITTEE OPINION

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Committee on Patient Safety and Quality Improvement

This document reflects emerging concepts on patient safety and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed.

Standardization of Practice to Improve Outcomes

ABSTRACT: Protocols and checklists have been shown to improve patient safety through standardization and communication. Standardization of practice to improve quality outcomes is an important tool in achieving the shared vision of patients and their health care providers.

Video clip

There may be many appropriate ways to treat a condition

When using a team approach (with changing teams) – let's pick one and get real good at it

Maternal Safety Bundles

- Maternal Early Warning Triggers
- Preeclampsia/Severe Hypertension
- Obstetric Hemorrhage
- Maternal Venous Thromboembolism
- Safe Reduction of Primary Cesarean Birth
- Maternal Mental Health: Depression & Anxiety
- Obstetric Care for Women with Opiod Use Disorder
- Reduction of Peripartum Racia/Ethnic Disparities
- Postpartum Care Basics for Maternal Safety

Everyone here has been warned of the approaching storm. The storm is now here, so what are we going to do?

Attack Each Other

Run From the Problem?

Freeze and Do Nothing, Status Quo?

Let the Sun Set on Quality Safe Care in Our State?

The Answers Must Come From Us!

- But remember, the problem is not about any one person in this room, it is not about any one entity or about any one political party, it is only about the pregnant mothers of our state and their babies.

None of us is as smart as all of us.
~ Ken Blanchard

THANK YOU