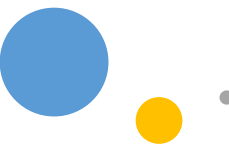## Slide 1

Use of Innovative Technology to Support Transitions and Continuity of Care for Quality Patient Outcomes

- Cindy Hayes DNP, MSN-ed, RN, CPAN, CAPA, CNE
- Assistant Professor
- Loyola University Chicago
- Marcella Neihoff School of Nursing
- chayes7@luc.edu

- Scholarly Project
- University of Michigan School of Nursing
- Ann Arbor, Michigan

Slide 2

Objectives

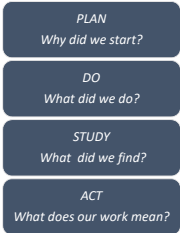At the end of the institute, participants will be able to:

1. **Examine** strategic informatics applications supporting interprofessional patient care and collaborations in the value-driven health care system.
2. **Discuss** creative informatics innovations designed to **support** quality outcomes of patient care.
3. **Identify** outcome measures to increase nursing documentation efficiency and care coordination for quality, value-driven care.
4. **Explore** gaps in the health IT environment and actions necessary for the support of new models of health care delivery and reimbursement

SINI2O19
39th Summer Institute in Nursing Informatics
Healthcare Informatics: A Catalyst for Value-Driven Care Transitions
July 17-19, 2019
University of Maryland School of Nursing, Baltimore, MD

Slide 3

Disclosure

The author/speaker has no disclosures

Slide 4

Quality Improvement Framework

- **PLAN** — Why did we start?
- **DO** — What did we do?
- **STUDY** — What did we find?
- **ACT** — What does our work mean?

http://www.squire-statement.org/index.cfm?fuseaction=document.viewDocument&documentId=1&documentFormatId=1&vDocLinkOrigin=1&CFID=15135665&CFTOKEN=33fdd0a1b5bfee77-9C6B1B6D-1C23-C8EB-80010665E24E8EA8
http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx
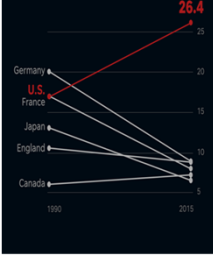
Slide 5

University of Michigan School of Nursing DNP Scholarly Project

- Implementation and Evaluation of Cumulative Quantitative Blood Loss (QBL) Training Program: Creating Early Recognition of Obstetric Hemorrhage for Every Patient at Cesarean Delivery

- *Innovative Technology Project within the Scholarly Project-EHR QBL Calculator*

Slide 6

Why Start?
National Recognized Maternal Health Urgency

26.4

Germany
U.S.
France
Japan
England
Canada

1990   2015

Hemorrhage
Extreme blood loss is a leading cause of mothers dying and suffering severe injuries. As many as

90%
of deaths could be prevented.

Here's what your hospital should do to protect you:

Kassenbaum, N. J., Barber, R. M., Bhutta, Z. A., Dandona, L., & Gething, P. W., et al. (2016, October 8). Global, regional, and national levels of maternal mortality 1990-2015: A systematic analysis for the global burden of disease study 2015. *The Lancet, 388*(10053), 1775-1812. http://dx.doi.org/10.1016/S0140-6736(16)31470-2

Two women die in childbirth almost every day in America About 700 a year

https://www.usatoday.com/deadly-deliveries/interactive/how-hospitals-are-failing-new-moms-in-graphics/

Slide 1: Rising Mortality Just the Tip of the Iceberg

Severe Morbidity Doubled

About **137** women per day — 50,000 per year — suffer severe complications or life-threatening injuries.

https://www.usatoday.com/deadly-deliveries/interactive/how-hospitals-are-failing-new-moms-in-graphics/

Slide 2: Obstetric Hemorrhage Patient Safety Bundle

National Charge: Every Birthing Center

Technology Needed to support nurse-driven process

COUNCIL ON PATIENT SAFETY IN WOMEN'S HEALTH CARE

PATIENT SAFETY BUNDLE — Obstetric Hemorrhage

READINESS
Every unit
- Hemorrhage cart with supplies, checklist, and instruction cards for intrauterine balloons and compressions stitches
- Immediate access to hemorrhage medications (kit or equivalent)
- Establish a response team – who to call when help is needed (blood bank, advanced gynecologic surgery, other support and tertiary services)
- Establish massive and emergency release transfusion protocols (type-O negative/uncrossmatched)
- Unit education on protocols, unit-based drills (with post-drill debriefs)

RECOGNITION & PREVENTION
Every patient
- Assessment of hemorrhage risk (prenatal, on admission, and at other appropriate times)
- Measurement of cumulative blood loss (formal, as quantitative as possible)
- Active management of the 3rd stage of labor (department-wide protocol)

RESPONSE
Every hemorrhage
- Unit-standard, stage-based, obstetric hemorrhage emergency management plan with checklists
- Support program for patients, families, and staff for all significant hemorrhages

REPORTING/SYSTEMS LEARNING
Every unit
- Establish a culture of huddles for high risk patients and post-event debriefs to identify successes and opportunities
- Multidisciplinary review of serious hemorrhages for systems issues
- Monitor outcomes and process metrics in perinatal quality improvement (QI) committee

May 2015

Slide 3: A State of Concern

US & MI Pregnancy-Related Mortality by Race-Ethnicity
Per 100,000 live births

	Overall	White	African American	Rate Difference	Rate Ratio
Michigan	22.2	16.6	50.8	34.3	3.1
United States	15.6	11.5	35.8	24.3	3.1

Michigan Pregnancy-Related Mortality compared to other states
- African American — 3rd Highest tied New Jersey
- Overall Pregnancy-Related — 8th Highest
- White — 11th Highest
- Racial Disparity — 15th Highest

(MI AIM Webinar)(Jan. 2018) reprinted with permission from Jones, J. Feb. 2018)

Slide 4: Rationale for New Standardized Process

- Substandard care use of Estimated Blood Loss (EBL)-Sets up:
  "Twin Phenomena Denial and Delay"
  - "Guesstimating"
  - Subjective
- Lack of standardized objective process
- Nurses' decisions and communication based on guessing

Association of Women's Health, Obstetric and Neonatal Nurses. (2014, February/March). AWHONN launches postpartum hemorrhage project. *Nursing for Women's Health, 18*(1), 81-82. http://dx.doi.org/10.1111/1751-486X.12098
Lyndon, A., Lagrew, D., Shields, L., Main, E., & Cape, V. (2015). *Improving health care response to obstetric hemorrhage version 2.0* (California Maternal Quality Care Collaborative Toolkit to Transform Maternity Care Contract #11-10006 with the California Department of Public Health; Maternal Child and Adolescent Health Division; Published by the California Maternal Quality Care Collaborative). Retrieved from California Maternal Quality Care Collaborative: https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit

Slide 5: A State Making Change at Scale: Available Knowledge

CDPH Public Health

Maternal Mortality Rate, California and United States; 1999-2013

HP 2020 Objective = 11.4 Deaths per 100,000 Live Births

OB Hemorrhage QI Toolkit* Collaboratives
Preeclampsia QI Toolkit* Collaboratives

SOURCE: State of California, Department of Public Health. California Birth and Death Statistical Master Files, 1999-2013. Maternal mortality for California (deaths ≤ 42 days postpartum) was calculated using ICD-10 cause of death classification codes A34, O00-O95.0 O96-O99.. United States data and HP2020 Objective use the same codes. U.S. maternal mortality data is published by the National Center for Health Statistics (NCHS) through 2007 only. U.S. maternal mortality rates from 2008 through 2013 were calculated during CDC Wonder Online Database, assessed at http://wonder.cdc.gov on March 11, 2015. Produced by California Department of Public Health, Center for Family Health, Maternal, Child and Adolescent Health Division, March, 2015.
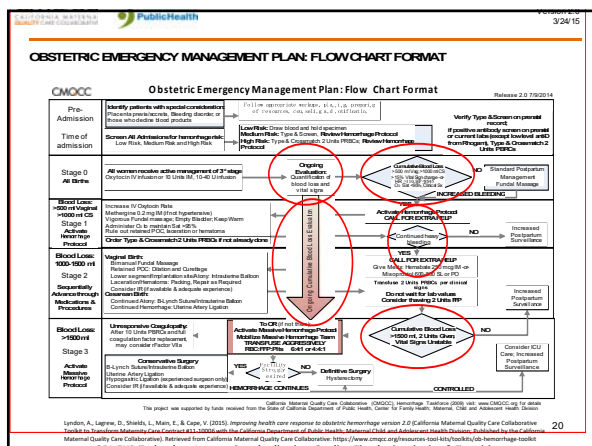*CMQCC QI Taskforces and Toolkit supported by CDPH, thru Title V Grant support

Slide 6: Rationale for QBL & EHR Integration

- Patient Safety-Best Practice
- Work Intensive/Cognitive Load
- Cumulative Quantification
  - Gravimetric(1 gm=1ml)+Direct(ml)
    - Iterative
    - Foundation for stage-based interventions
- Gravimetric
  - Weight
  - 1 gm = 1 ml
  - Wet-dry
- Direct
  - Suction blood
- Document/Report
  - Call-out QBL
  - Real-time
  - Un-silo blood loss

Association of Women's Health, Obstetric and Neonatal Nurses. (2014, February/March). AWHONN launches postpartum hemorrhage project. *Nursing for Women's Health, 18*(1), 81-82. http://dx.doi.org/10.1111/1751-486X.12098
Lyndon, A., Lagrew, D., Shields, L., Main, E., & Cape, V. (2015). *Improving health care response to obstetric hemorrhage version 2.0* (California Maternal Quality Care Collaborative Toolkit to Transform Maternity Care Contract #11-10006 with the California Department of Public Health; Maternal Child and Adolescent Health Division; Published by the California Maternal Quality Care Collaborative). Retrieved from California Maternal Quality Care Collaborative: https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit

"");

**Exit

ExitInternal

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Slide 1 (top-left):

OBSTETRIC EMERGENCY MANAGEMENT PLAN: FLOW CHART FORMAT

Obstetric Emergency Management Plan: Flow Chart Format

QBL EHR Technology Impact: Standardization, Quality, Timely, Continuity, & Transition

Slide 2 (top-right):

DO

Test-run IT-Build

Test-run IT in learning space missed opportunity

QBL Training Program Intervention:
- Phase 1: Test-run (7/24/18)
- Phase 2: Pilot (7/31/18-8/14/18)

Pre- Post-Intervention Quasi-Experimental

Design

Slide 3 (middle-left):

PLAN

AIMS

1. To test-run and pilot of QBL simulation-based training program.

2. To test-run and pilot of EHR QBL calculator in the practice environment within the QBL simulation-based training program.

3. To create an electronic education and simulation-based training program library for annual competency and new-nurse orientation.

Slide 4 (middle-right):

DO

1. QBL Calculator Build Test-run
2. QBL Program Test-run
3. Pilot

- **Build**
  - ✓ Planning Phase changes
  - ✓ Test-run changes
    - **Education and Training**
      - ✓ Module
      - ✓ Usability
- **Connectivity**
  - **Test-run changes**
    - ✓ Problem complex & scaffolding layers to connect to QBL calculator during project
    - ✓ HITS management of learning space
    - ✓ Deployment of equipment
- **IT Barriers**
  - ✓ Test-run IT in learning space before sim test-run
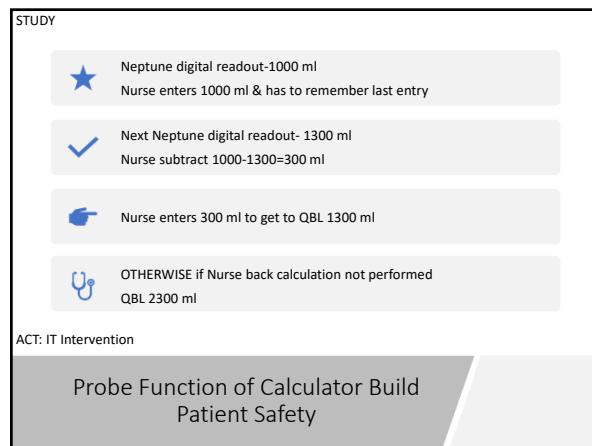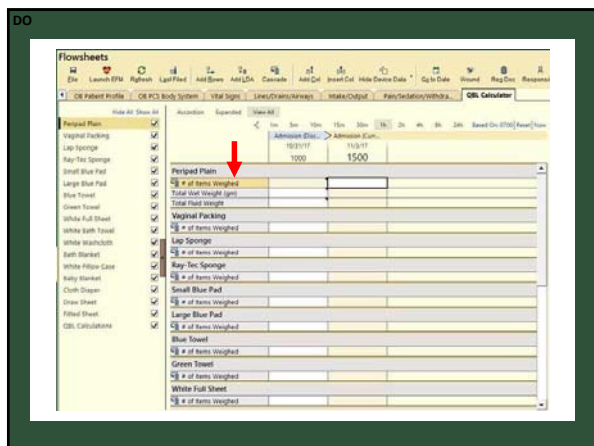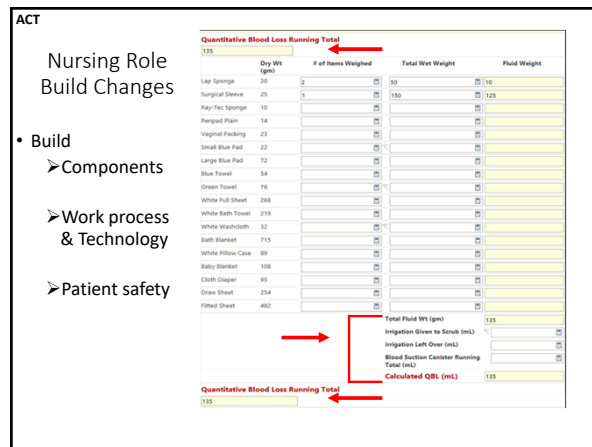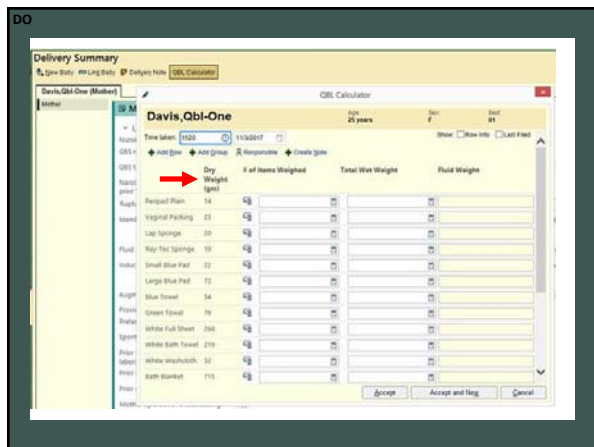 - ✓ Education and training of IT prior to sim experiences

Slide 5 (bottom-left):

Methods | *What did we DO?*

Slide 6 (bottom-right):

DO

Build: Context

- IT supports safety and nursing process
  - Understand the work
  - Ask questions
  - Learn

University of Michigan Von Voigtlander Women's Birth Center

- Create IT to support authentic nursing process
- IT supporting nursing process creates buy-in frontline providers

IT Build

Nursing Role Build Changes

- Build
  - Components
  - Work process & Technology
  - Patient safety

STUDY

Neptune digital readout-1000 ml
Nurse enters 1000 ml & has to remember last entry

Next Neptune digital readout- 1300 ml
Nurse subtract 1000-1300=300 ml

Nurse enters 300 ml to get to QBL 1300 ml

OTHERWISE if Nurse back calculation not performed
QBL 2300 ml

ACT: IT Intervention

Probe Function of Calculator Build
Patient Safety

Slide 1 (DO):

DO

QBL Program Test-run

1 Pre-test | 2 Didactics | 3 Interactive Stations | 4 QBL step-by-step Simulation | 5 Novel Content Validity Rating-QBL at Cesarean Delivery Checklist | 6 Scenario Content Validation | 7 Debriefing | 8 Summary of Test-run-Rapid cycle changes | 9 Post test | 10 Surveys

Slide 2 (STUDY):

STUDY

Results

Meaning Units=	Positive	Neutral	Negative	Total
Calculator related	0%	24%	47%	71%

- Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today, 24*(2), 105-112. http://dx.doi.org/10.1016/j.nedt.2003.10.001

Slide 3 (DO):

DO

SKILLS   COMMENTS

Evaluation Measures-Performance Improvement Feedback/Usability

Slide 4:

ACT Before Pilot
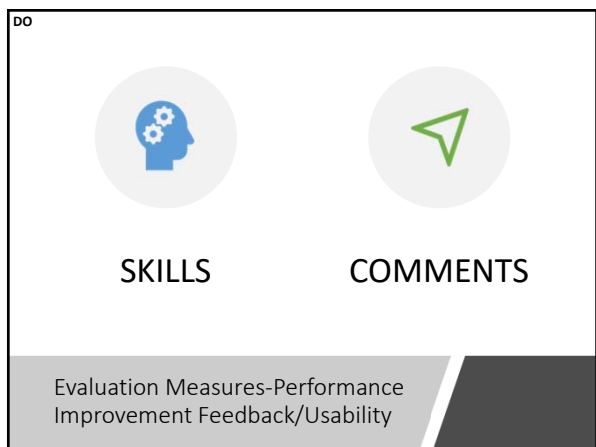
IT Education Module

- Critical *New Technology*
  - Usability
  - IT to improve processes not hinder or get in the learner's way
- Complete before 1st pilot simulation of new process
  - Otherwise IT barrier to simulation training
  - Primary learning outcome at risk
- Trouble-shooting-IT staff present during training

Slide 5 (STUDY):

STUDY

Evaluation of the Cycles of Change

QBL Simulation-based Checklist

QBL Program Evaluation Survey

QBL Checklist Attitude Survey

Sub-divided into meaning units

Slide 6 (PLAN):
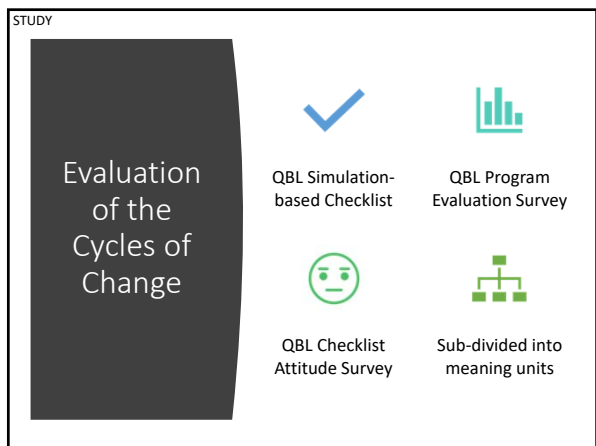
PLAN

Summary of Participant Demographics (n=25)		
Domain	Option	Raw (%)
Years' Experience as a Nurse		
	0-5 years	1 (4%)
	6-10 years	6 (24%)
	11-15 years	2 (8%)
	16-20 years	9 (36%)
	>21 years	3 (12%)
	Not Applicable (STs)	4 (16%)
Years Worked in Obstetrics Nursing		
	<6 months	0 (0%)
	6-12 months	1 (4%)
	2-5 years	2 (8%)
	6-10 years	5 (20%)
	11-15 years	2 (8%)
	16-20 years	7 (28%)
	>21 years	4 (16%)
	Not Applicable (STs)	4 (16%)
QBL Experience	Yes	11 (44%)
	No	14 (56%)
Highest Level of Education	ADN	5 (20%)
	BSN	13 (52%)
	MSN	3 (12%)
	Other	4 (16%)
Certification		
	RNC-MNN	1 (4%)
	RNC-OB	7 (28%)
	Other/None	17 (68%)

PLAN

Objective: Psycho-motor Learning Objectives(Skill)

Following training, the learner will be able to:

1. Demonstrate the step-by-step protocol for cumulative QBL at cesarean delivery.

2. Demonstrate complete documentation of cumulative QBL in the EPIC QBL calculator.

3. Demonstrate communicating QBL with OB team.

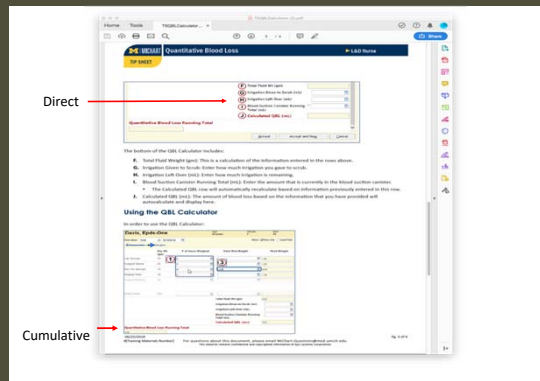4. Demonstrate cumulative QBL level to ask for assistance.

Measurement Tool

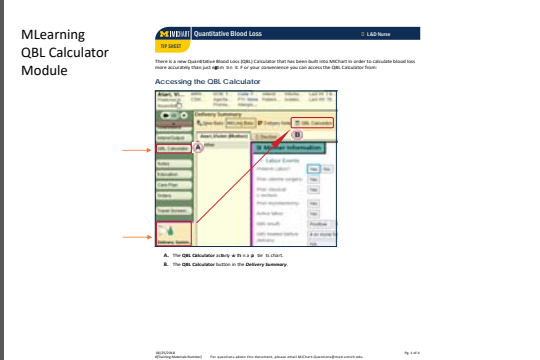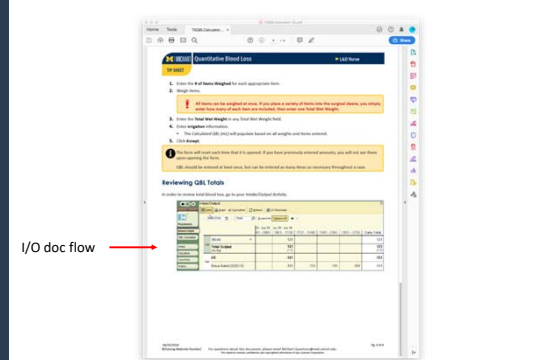Simulation-based Checklist

Learner Objectives & Measurement Tool Alignment

DO

Direct

Cumulative

DO

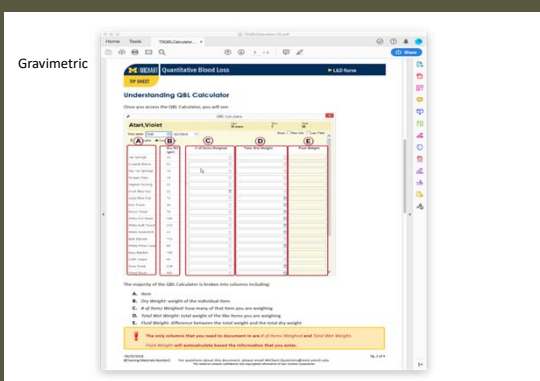MLearning QBL Calculator Module

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DO

I/O doc flow

DO

Gravimetric

STUDY

Wired capacity

Wi-Fi capability

Server coverage-inadequate for amount of learners in the learning space

Test-run computers were not capable of getting or staying connected to wireless network and lack of wired outlets needed for learners

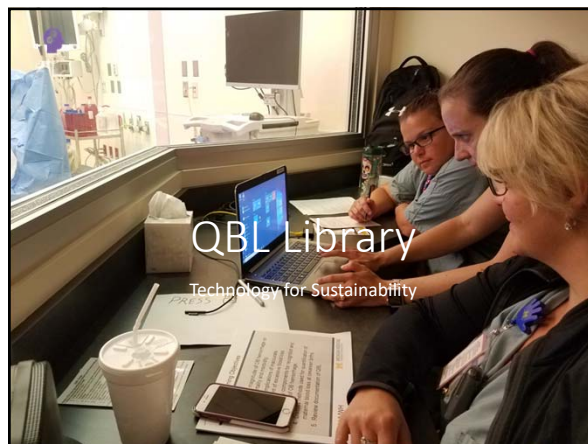Results: Test-run Connectivity Rapid Cycle Improvements

ACT

HITS & CSC-rapid cycles changes for Pilot

Pilot improved performance, but server capacity remained as an issue

Calculator worked, however, the start and stops impacted our learner's experience

Act: Test-run Connectivity Rapid Cycle Improvements

QBL Library
Technology for Sustainability

What did we accomplish related to the aims?

Library Content

- QBL OR Floor Plan
- QBL OR Floor Plan Measurements for Set-up
- QBL Process Flow Map
- QBL Education and Training Program Learning Objectives: Cognitive, Technical, and Behavioral
- Clinical Simulation Center QBL Instructional Plan
- Laerdal Scenario Validation Checklist
- QBL Policy and Procedure at Cesarean Delivery
- QBL Pre-Test
- QBL Pre-Learning Didactic Material: (a) AWHONN QBL YouTube Video, and (b) Microsoft® Power Point® Presentation: Obstetric Hemorrhage: Implementing Your Bundle Component Cumulative Quantification of Blood Loss (QBL) at Every Cesarean Delivery and QBL Calculator Module and Practice
- QBL Pocket Guide-QBL Steps/Risk Assessment
- QBL Calculator Tip Sheet
- QBL Interactive Skills Stations Guide
- QBL Interactive Skills Stations Guide-Picture Set-up file
- QBL Simulation Set-up Video
- Neptune® MLearning Module
- QBL Simulation Guide for Assessment and Measurement at Cesarean Delivery Simulation Guide: Objectives, Supplies and Resources, Pre-Learning, Pre-Brief, Simulation Scenarios- Scenario-Low/Medium Risk Cesarean Delivery (< 1000 ml QBL) and Scenario-Medium/High Risk-OB hemorrhage Cesarean Delivery (>1500 ml Trigger QBL Designee)
- Role Cards: Baby RN, Circulator RN 1st & 2nd scenario, Designee RN/ST, Surgeon/ST
- Content Validity Rating Form-Cumulative QBL at Cesarean Delivery
- QBL Pilot Simulation Checklist
- QBL Simulation Debriefing Tool
- QBL Post-Test, Interactive Worksheet, and Surveys (QBL Program Evaluation, & QBL Checklist)

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
Pre-test	Didactic	QBL Calculator	Interactive Stations	Neptune®	Pilot QBL Simulation-based Checklist	QBL step-by-step Simulations •Role Cards •QBL Pocket Cards	Debriefing	Rapid cycle changes	Post-test	Surveys

QBL Simulation Training Program Intervention

Discussion
What does it mean?

Slide 1

Strengths and Benefits
Build and Leverage of Local QI Infrastructure

Team Formation

Clinicians

Educators

Learning Space Partners

IT Practitioners

IT Management Plan

Clinical Integration

Curriculum Design

Learning Space Operationalization

Rapid Cycle Improvement

PDSA

Test-run IT Integration

Test-run IT in Learning Space

Slide 2

IT Champion

- Role:
  - Pay attention to innovation in technology-how will IT help us to better care for our patients
  - Advocate for IT that will help our nursing staff take care of patients on the continuum
  - Invest in a good system-augment authentic process
  - Be careful making decisions based on financial impact and the bottom line more than looking at innovation
  - Ultimate goal to improve patient outcomes at every point of care

Slide 3

Challenges Innovative Technology

🏠	QBL Calculator	Build Connectivity Calculator pre-learning
🏋	Neptune®/Equipment	
$	Funding	
📅	Scheduling	
⏱	Inertia	
⚲	Quality Improvement Fatigue/Competition	

Slide 4

Thank you!
Questions?

Slide 5

Usefulness of the work	25 Local participants Effectively trained Goal-take back to clinical setting
Suggest next steps	Continuity Plan-25 super-users for "go-live" Blitz for remainder of nurses-QBL Library (In-situ training) All new nurse orientation receive intervention
Spread	Evolve training program test of change across vaginal deliveries Un-Silo blood loss for continuity and transition of care Other surgical theaters & trauma
Sustainability	Going forward-focus on IT Pre-Training Reduce intervention from 4 to 2 hours
Quality	QI-nurse–driven standardized QBL process Continuity of Care-Transition t/o Birth Center Through patient safety initiative potential to decrease maternal morality/morbidity

Implications for Practice