ILPQC Mothers and Newborns Affected by Opioids (MNO) Workgroup

October 16, 2017

1:00 – 2:00 pm

Overview

- Welcomes
- Updates
- MNO Timeline
- Literature Review
  - NAS Assessment Tools
  - Non-Pharmacological Care for NAS Infants
- Lit Review Schedule and Next Steps

NOW ACCEPTING Poster Session Abstracts for 5th AC

- **All teams** submit an abstract sharing the great Golden Hour QI work they've done, including their **plans for sustainability / on going work in 2018**
- Welcome to submit additional abstracts regarding mothers / newborns affected by opioids, IPLARC, and patient & family engagement or other QI projects teams want to share.
- Submit abstracts by November 13th to qualify for awards of excellence
- Late Breaking abstracts may be submitted through Nov 27th

Submit abstracts through link below:

https://www.surveymonkey.com/r/ILPQC_5th_ACAbstractSubmission

Earn ABD MOC Part IV Participating in ILPQC GH Initiative!

DUE: October 31, 2017

- **You are eligible for 25 American Board of Pediatrics MOC Part 4 points!.**
- **Complete form & have your local GH project leader sign it**
- **Email to info@ilpqc.org**
- **Instruction PDF attached above in “Resources”**

Congrats on VON Abstract Acceptance on Golden Hour

- **State Collaborative Learning Track Podium Presentation**
  - Sunday, October 29th, 1:15pm to 2:30pm at TBD
- VON Learning Fair Poster Session
  - Saturday, October 28th , 3:30pm to 5:00pm at the Riverwalk Exhibition Hall
- Hall of States Poster Fair Poster
  - Sunday, October 29th, 9:50am to 10:20am at the Ballroom Promenade

Save the Date!

ILPQC 5th Annual Conference

Tuesday, December 19

Westin Lombard

Planning for speakers with Neonatal, OB, and patient perspectives on opioids

Annual Conference Hotel Block Room Reservations

- https://www.starwoodmeeting.com/events/start.action?id=1710035949&key=21CC118E
- Group rate of $139 single/double available until Nov 27, 2017

2017 Annual Conference Agenda – In Progress

8:00-8:45	Welcome- TBD Year in review- Ann
8:45-9:30	Keynote- Matthew Grossman (MNO, Neonatal/Newborn)
9:30-9:45	Break
9:45-11:15	Panel – 3 leaders from state PQC initatives (Carole Lannon, Julie DeCesear, TN?)
11:15-12:00	Plenary- Tamela Milan (MNO, Patient & Family)
12:00-1:30	Lunch & Poster Session
1:30-2:15	Plenary- Elizabeth Krans? (MNO, OB)
2:15-3:00	Plenary - Amy Crockett? (IPLARC)
3:00-3:15	Break
3:15-5:00	Breakouts: OB, Neo, Patient & Family Engagement
5:00-5:15	Wrap-Up & Evaluation

MNO Next Steps

- OB work Alignment with ACOG CO https://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Opioid-Use-and-Opioid-Use-Disorder-in-Pregnancy
  - Early universal screening
  - Brief intervention
  - Referral to Tx / Opioid agonist pharmoacotherapy
  - Avoid/minimize use of opioids for pain
  - Adapt OB care
  - Safe prescribing practices
  - Postpartum support
- OB team participating in ACOG AIM Opioid Bundle implementation pilot group http://safehealthcareforeverywoman.org/patient-safety-bundles/obstetric-care-for-women-with-opioid-use-disorder/

MNO To Dos

- Align with State Opioid Action Plan: Prevention (OB), Treatment (OB), Response (Neo)
  - **Increase % of newborns with known exposure to opioids receiving reliable newborn screening**
  - **Increase % of newborns with known exposure to opioids receiving standardized non-pharmacological treatment bundle**
  - **Increase % of hospitals using evidence-based standardized NAS pharmacological treatment protocol**
- Develop Aims, Measures, Data Form, Key Drivers Diagram (Oct-Dec 2017)
- Develop data system (Jan-Mar 2018)
- Launch with teams (all/some) (April-May 2018)

Literature Review

Tools to Assess Severity of Neonatal Abstinence Syndrome

Mary Puchalski, DNP, APRN, CNS, NNP-BC
Neonatal Nurse Practitioner, Ann & Robert H. Lurie Children's Hospital of Chicago
Christine M. Emmons, MSN, MPH, CNL, RNC-NIC
Neonatal Outreach Educator, St John's Hospital
Mary Hope, RN, BSN
Neonatal Outreach Educator, Cardinal Glennon Children's Hospital
Steve M. Liao, MD, MSCI
Associate Medical Director, MoBap NICU

NAS Scoring – Purpose

- Used to organize the signs and symptoms of withdrawal into a measurable entity
- Generally a numerical value is used to drive the threshold for instituting pharmacologic treatment

Tools to Assess NAS

- Finnegan Neonatal Abstinence Score (FNAS)
- Modified Finnegan Neonatal Abstinence Score (MFNAS or M-FNAST)
- Simplified Finnegan Neonatal Abstinence Scoring System (sFNAS)
- Finnegan Neonatal Abstinence Scale–Short Form (FNAS:SF)
- Neonatal Withdrawal Scoring System (NWSS)
- Neonatal Withdrawal Inventory (NWI)
- Neonatal Narcotic Withdrawal Index (NNWI)
- MOTHER score
- Ostrea System

Finnegan Neonatal Abstinence Score (FNAS)

- Theoretical underpinning: organize most commonly observed symptoms by researcher's "experience" into scoring system
  - 32 indicators assigned a number 1 – 5 based on "pathological significance" → face validity only
- Reliability measure: Inter-rater reliability coefficient 0.75 – 0.96, mean of 0.82 (P< 0.005)
- Threshold for pharmacologic treatment score ≥ 8

Finnegan LP, Kron RE, Connaughton JF, Emich JP. Assessment and treatment of abstinence in the infant of the drug-dependent mother. *Int J Clin Pharmacol Biopharm. 1975;12(1-2):19-32.*

Finnegan Neonatal Abstinence Severity Score (FNAS)

- *'The infant with a score of "7" or less was not treated with drugs for the abstinence syndrome because, in our experience, he would recover rapidly with swaddling and demand feedings. Infants whose score was "8" or above were treated pharmacologically.'*

Neonatal Abstinence Syndrome: Assessment and Management. Addictive Diseases: an International Journal 2 (1) 141-158 (1975)

	Signs & Symptoms	Score
Central Nervous System Disturbances	Excessive high pitched (or other) cry	2
	Continuous high pitched (or other) cry	3
	Sleep for less than 1 hour after feeding	3
	Sleeps for less than 2 hours after feeding	2
	Sleeps for less than 3 hours after feeding	1
	Hyperactive Moro reflex	2
	Markedly hyperactive Moro reflex	3
	Mild tremors disturbed	1
	Moderate-severe tremors disturbed	2
	Mild tremors undisturbed	3
	Moderate-severe tremors undisturbed	4
	Increased muscle tone	2
	Excoriation (specific area)	1
	Myoclonic jerks	3
	Generalized convulsions	5
Metabolic / Vasomotor / Respiratory Disturbances	Sweating	1
	Hyperthermia 37.2 – 39.2° C	1
	Hyperthermia greater than 38.4°C	2
	Frequent yawning (more than 3 – 4 times per scoring interval)	1
	Mottling	1
	Nasal stuffiness	1
	Sneezing (more than 3 – 4 times per scoring interval)	1
	Nasal flaring	2
	Respiratory rate greater than 60	1
	Respiratory rate greater than 60 with retractions	2
Gastrointestinal Disturbances	Excessive sucking	1
	Poor feeding (infrequent/uncoordinated suck)	2
	Regurgitation (more than 2 times during/after feeding)	2
	Projectile vomiting	3
	Loose stools (curds/seedy appearance)	2
	Watery stools (watering ring around stool)	3

Modified Finnegan Neonatal Abstinence Severity Score (MFNASS)

- Various modified tools emerged
  - Finnegan 1894, 1990
  - Finnegan and Kaltenbach 1992
- 21 indicators from the original FNASS organized into three categories: gastrointestinal, metabolic, and CNS
- No validity or reliability measure performed
- Most used tools in US today

Modified Finnegan Neonatal Abstinence Score (MFNAS or M-FNAST)

- All symptoms noted in 3 – 4 hour period are scored
- Score indicating need for pharmacologic therapy
  - ≥ 8 (3 consecutive scores of 8)
  - Average of 3 equaling 8
  - 2 scores of 12
  - Average of 2 consecutive scores equaling 12
- Validity of using these values as cut-off points evaluated in 2010 in term newborns without *known* opiate exposure (only tested for opiates if their score was high) – 95% of scores were < 8

Zimmermann-Baer U, Noetzli U, Rentsch K, Bucher HU. Finnegan neonatal abstinence scoring system: normal values for first 3 days and weeks 5-6 in non-addicted infants. Addiction. 2010;105(3):524-528.

Modified Finnegan Neonatal Abstinence Score (MFNAS or M-FNAST)

- Inter-Observer Reliability Program
  - Developed by Dr. Karen D'Apolito in 1993 as part of dissertation research on a rocking bed for use in infants with NAS
  - Educational program designed to improve consistency and reliability in scoring among nurses
  - Updated in 2010 – consultant Dr. L. Finnegan and Dr. Karol Kaltenbach
  - Program materials → DVD and written materials
  - Recommended process:
    - All staff view DVD
    - One staff performs exam / the other observes
    - Both score without discussion
    - Check reliability percentage using "Agreement Chart"
      - Considered reliable – score 90% or greater

D'Apolito, K, and Finnegan, L. (2010). Assessing Signs and Symptoms of Neonatal Abstinence Using the Finnegan Scoring Tool. An inter-observer reliability program https://neoadvances.com/

Modified Finnegan Neonatal Abstinence Score (MFNAS or M-FNAST)

- Inter-Observer Reliability Program
  - Frequency of performing reliability checks determined by individual units
    - If months go by without using tool – weekly checks might be recommended
  - Lengthy program, costly, proprietary materials
  - Recommends use of other proprietary bedside tools not evaluated by research
    - Sleeping record (D'Apolito 2009)
    - Sneezing and yawning record (D'Apolito 2009)

D'Apolito, K, and Finnegan, L. (2010). Assessing Signs and Symptoms of Neonatal Abstinence Using the Finnegan Scoring Tool. An inter-observer reliability program https://neoadvances.com/

Simplified Finnegan Neonatal Abstinence Scoring System (sFNAS)

- 2 institutions in Midwest with high rate of NAS
  - 185 subjects, 27,447 scores
  - 182 infants, 12,847 scores
- Used Pearson's correlation of indicators to eliminate/combine/condense the majority of items from the FNAS observed in > 10% of instances
- Scoring indicators decreased to 10 (from 21)
- Threshold for treatment decreased to 6

Gomez Pomar E, Finnegan LP, Devlin J, et al. Simplification of the Finnegan Neonatal Abstinence Scoring System: retrospective study of two institutions in the USA. BMJ Open. 2017;7(9):e016176.

Simplified Finnegan Neonatal Abstinence Scoring System (sFNAS)

- Final Pearson's correlation of 0.914 with original FNAS
- Not evaluated for utility of recommended threshold score for treatment nor inter-rater reliability, sensitivity and specificity as a tool for initiation of treatment

Gomez Pomar E, Finnegan LP, Devlin L, et al. Simplification of the Finnegan Neonatal Abstinence Scoring System: retrospective study of two institutions in the USA. *BMJ Open*. *2017;7(9):e016176*.

MOTHER NAS Scale

- Added and removed items to the FNAS to create a 19-item scale, recommending treatment for scores ≥ 9
- Used in the Maternal Opioid Treatment: Human Experimental Research (MOTHER) project
- Subsequently modified to develop a short screening tool – val

Jansson LM, Velez M, Harrow C. The opioid-exposed newborn: assessment and pharmacologic management. J Opioid Manag. 2009;5(1):47-55.

Jones HE, Seashore C, Johnson E, et al. Psychometric assessment of the Neonatal Abstinence Scoring System and the MOTHER NAS Scale. Am J Addict. 2016;25(5):370-373.

Finnegan Neonatal Abstinence Scale–Short Form (FNAS:SF)

Items	Score
Mild/early signs	
1. Crying:	
high pitched	2
continuous and high pitched	3
2. Sleeps:	
<1 h after feeding	3
<2 h after feeding	2
<3 h after feeding	1
3. Increased muscle tone	2
Moderate/progressing signs	
4. Tremors	
Undisturbed, mild	3
Undisturbed, moderate-severe	4
5. Respiratory rate	
>60/min	1
>60/min w/retractions	2
6. Sweating	1
7. Excessive sucking	1
Total	0–16

- Analyzed 33,856 scores from 171 infants with NAS, 1 organization
- Used a factor analysis to decrease the number of indicators from the FNAS down to 7 items
- Pearson's correlation of 0.91
- Author recommends if score is high to reevaluate with full MFAST

Maguire D, Cline GJ, Parnell L, Tai CY. Validation of the Finnegan neonatal abstinence syndrome tool-short form. Adv Neonatal Care. 2013;13(6):430-437.

Parameter	Finding	Points
Tremors (muscle activity of limbs)	Normal	0
	Minimally increased when hungry or disturbed	1
	Moderate or marked increase when disturbed; subsides when fed or held snugly	2
	Marked increase or continuous even when undisturbed going on to seizure-like movements	3
Irritability (excessive crying)	None	0
	Slightly increased	1
	Moderate to severe when disturbed or hungry	2
	Marked even when undisturbed	3
Reflexes	Normal	0
	Increased	1
	Markedly increased	2
Stools	Normal	0
	Explosive but with normal frequency	1
	Explosive more than 8 per day	2
Muscle tone	Normal	0
	Increased	1
	Rigidity	2
Skin abrasions	None	0
	Redness of knees and elbows	1
	Breaking of the skin	2
Respiratory rate	Less than 55 breaths per minute	0
	55 – 75 breaths per minute	1
	76 – 95 breaths per minute	2
Repetitive sneezing	No	0
	Yes	1
Repetitive yawning	No	0
	Yes	1
Vomiting	No	0
	Yes	1
Fever	No	0
	Yes	1

Neonatal Drug Withdrawal Scoring System (Lipsitz)

Lipsitz PJ. A proposed narcotic drug withdrawal score for use with newborn infants. Clinical Pediatrics. 1975; 14: 592-594

- 11 item scale
  - Each item numerically scored 0 – 3 based on severity of symptoms
- Score of ≥ 4 recommended as threshold for initiation of pharmacotherapy
- Subjective – 4 items scored yes/no
- Interrater reliability 0.92 and 77% sensitivity

Neonatal Withdrawal Inventory (NWI)

Parameter	Finding	Points
Muscle tone	Hypertonic	2
	Not hypertonic	0
Moro reflex	Hyperactive	2
	Not hyperactive	0
Tremors	When undisturbed	4
	When disturbed	3
	Absent	0
Sneezing or yawning	> 2 per examination session	1
	Absent	0
Sweating or mottling	Present	2
	Absent	0
Regurgitation	Present	2
	Absent	0
Stools	Loose and watery	2
	Formed	0
Crying and excoriations	Continuous crying	4
	Fresh excoriation of limbs (with or without crying)	3
	Crying or frantic fist sucking	2
	Irritability and restlessness even after intervention	1
	All of the above absent	0

Zahorodny W Rom C et al. The Neonatal Withdrawal Inventory: A simplified score for newborn withdrawal. Developmental and Behavioral Pediatrics. 1998; 19: 89-93

- Rapid (about 10 minutes to complete) flexible and easy to administer
- Method for examining the neonate:
  - Observation infant undisturbed in bassinet for 1 min
  - Unswaddling and gentle awakening
  - Determination of the respiratory rate for 1 minute
  - Measurement of the axillary temperature
  - Inspection of the extremities for signs of excoriation
  - Assessment of muscle tone and Moro reflex
  - Diaper change
  - Reswaddling and positioning
  - Observation of infant for 1 minute without intervention

Neonatal Withdrawal Inventory (NWI)

Zahorodny W Rom C et al. The Neonatal Withdrawal Inventory: A simplified score for newborn withdrawal. Developmental and Behavioral Pediatrics. 1998; 19: 89-93

- SUM points for all 8 parameters
- Interpretation:
  - Minimum score: 0
  - Maximum score: 19
  - A score of ≥ 8 is the threshold for pharmacotherapy
- NWI as compared to the Finnegan
  - Briefer: Score 8 items -vs- 21
  - Higher inter-rater reliability (0.89-0.98 -vs- 0.70-0.88)
  - Higher sensitivity and more specific under case-blinded conditions
  - Ease of use/training

Neonatal Narcotic Withdrawal Index (NNWI)

Green, M., & Suffet, F. (1981). The Neonatal Narcotic Withdrawal Index: A device for the improvement of care in the abstinence syndrome. American Journal of Drug & Alcohol Abuse, 8(2), 203-213. doi:10.3109/00952998108999125

Neonatal Narcotic Withdrawal Index

Item	0	1	2	Score
Respiratory Rate	<61	61-80	>80	
Crying	No crying without handling	< 5 min without without handling	≥ 5 min without handling	
Tremors handling	No tremors handling	< 5 min without	> 5 min without	
Muscle tone to sitting	Head lag to standing	Traction: pull	Traction: pull	
Axillary temp (highest in last 24 hr)	≤ 99	99.1-100	> 100	
Vomiting	0 or 1/24 hr	2/24 hr	> 2/24 hr	
Other	Snz. Diar.	Sweat	Skin Abr.	
(circle)	Gen. Sz LOC. SZ	Poor Suck	Saliv. Yawn	
	Stuffy Nose Hic.	Wt. Loss Term: >10%	Wt. Loss Pre: >15%	
Green & Suffet, 1981	0,1	2-4	5 and over	Total

- 6 item scale
  - Plus 1 additional (“other”) category with 12 additional symptoms
- Each item numerically scored 0 – 2 based on severity of symptoms
- Score of ≥ 5 is recommended as threshold of pharmacotherapy
- Interrater agreement by coefficient of correlation for individual items r = .7711 p < .01 and > 90% for total score.

Ostrea Tool

Ostrea EM, Chavez CJ, Strauss ME. A study of factors that influence the severity of neonatal narcotic withdrawal. J Pediatr. 1976;88(4 Pt 1):642-645.

- 6 symptom criteria ranked into simple categories of mild, moderate, severe withdrawal
- No proposed guide for treatment

Grossman, Yale New Haven Experience

An Initiative to Improve the Quality of Care of Infants With Neonatal Abstinence Syndrome. Pediatrics. 2017;139(6):e20163360

- Paradigm shift to the management of infants with NAS
- Key drivers of ALOS:
  - Nonpharmacologic interventions
  - Simplified assessment of infants
  - Decreased use of morphine
  - Communication between units

Grossman, Yale New Haven Experience

An Initiative to Improve the Quality of Care of Infants With Neonatal Abstinence Syndrome. Pediatrics. 2017;139(6):e20163360

- Approach intervention – 5 years, 8 PDSA cycles
  - Standardized nonpharmacologic care on inpatient unit – considered "treatment"
  - Transfer from WBN (aka mother/baby) to inpatient unit (pediatric)
  - Development of novel approach to assessment (ESC)
  - Spread of change concepts to NICU
  - Rapid morphine weans
  - Feed on demand
  - Prenatal counseling of parents – "you are the treatment for your baby"
  - Morphine given as needed (vs scheduled – not treated by a number)
  - Empowering messaging to parents (support/coach to care for baby)

Grossman, Yale New Haven Experience

An Initiative to Improve the Quality of Care of Infants With Neonatal Abstinence Syndrome. Pediatrics. 2017;139(6):e20163360

- Pharmacologic management
  - On inpatient unit
  - Functional assessment
    - Sleeping (≥ 1 hour after feeding)
    - Eating (breastfeed effectively or take ≥ 1 oz formula)
    - Consolability (consoled within 10 minutes)
  - Morphine given x1 if for failure in functional assessment (now waiting for 3 scores or 8 hours), then reassessed in 3 hours
  - Rapid morphine weans (by 10% up to 3 times per day)

"Hugs before drugs"

Grossman, Yale New Haven Experience

An Initiative to Improve the Quality of Care of Infants With Neonatal Abstinence Syndrome. Pediatrics. 2017;139(6):e20163360

- Outcomes
  - 287 infant with NAS
  - LOS ↓ from 22.4 to 5.9 days
  - Methadone-exposed infants Rx with morphine ↓ 98% to 14%
  - Hospital cost ↓ from $44,824 to $10,289
  - No infant readmitted for treatment

- Goal shifts from suppressing withdrawal to having infant function in a normal state

Grossman, Yale New Haven Experience

An Initiative to Improve the Quality of Care of Infants With Neonatal Abstinence Syndrome. Pediatrics. 2017;139(6):e20163360

- Other places using ESC
  - Boston Medical Center
  - Dartmouth
  - St Mary's, St. Louis

MSN, MPH, CNL, RNC-NIC

Challenges in Scoring

- No tool is considered “gold standard”
  - Inconsistencies with tools – multiple tools exist, some never methodically evaluated for reliability
  - Inconsistencies with definition of individual items
  - Some tools with many indicators, cumbersome for clinical application
- Indicators included only have face validity – derived from clinical experience
  - All tool’s indicators derived from original FNAS
  - Symptoms may be unrelated to infants function or comfort
  - Inconsistencies with definition of individual items

Challenges in Scoring

- No consensus as to threshold for pharmacologic treatment
  - Need for multiple high scores may delay pharmacologic treatment when needed
  - Inability to measure effectiveness of non-pharmacologic intervention
    - 6-12 hours delay or more for symptom relief due to scoring interval
- No agreement on interval between assessments
  - Waking a sleeping infant to score them often recommended – interferes with normal rhythm of demand feeding in the term infant

Challenges in Scoring

- Reliability of scoring tools is highly dependent on training of those using them
  - Inconsistencies with implementation of scoring and consequently treatment
  - Training needed for those applying scores – costly in nursing time
- Pharmacologic treatment primarily based on a assigned number by person scoring (generally RN)
  - Risk for treating numbers vs. the infant

Challenges in Scoring

- Tools applied beyond intended use
  - None of tools valid for preterm infant
  - Tools all designed for *term newborn* – how to apply scoring to infant > 3 – 4 weeks of age?
  - Indicators identified for *opiate* withdrawal – scoring used with infants exposed to other substances and with multi-drug exposure

NAS Scoring – a Thoughtful Approach?

- Evaluation should included assessment of:
  - Infant's resting state
  - How infant reacts to handling
  - How well infant reorganizes after handling
  - How well they take and tolerate feedings
- Scoring is not a reflection of a moment of time → all symptoms occurring since previous score should be included
  - Should reflect the complete neurobehavioral repertoire for the entire time period since the last score was given
- Changing threshold for scoring when infant is > 3 weeks old to reflect neurobehavioral maturity

Recommendations

- Start scoring infants soon after birth – no later than 4 hours of life
- Educate all healthcare providers on scoring system chosen
  - Mother/baby, NICU, pediatricians, neonatologists, NNPs, nursing, peds nurses (if float to NICU)
- Measure interrater reliability of the tool you are using on a regular basis (at least yearly)
  - Re-educate as needed/indicated
- Partner with parents in a very intentional way
  - Create/encourage them to hold/care for their infant 24/7 if possible
- Incorporate trained cuddlers when parents are not available

Recommendations

- Feed infant on demand – do not wake for feeding unless > 4 hours
- Don’t wake up an infant just to score them

Non-pharmacological Care for Opioid Affected Infants

Meg Behm, Leslie Caldarelli, Sue Horner

Introduction

Non-pharmacologic care is universally recommended in the literature as first-line treatment for all infants at risk of NAS, and it is an essential component of the ongoing management of NAS infants, including those requiring pharmacologic management.

Kocherlakota, 2014

Introduction

- NAS is characterized by symptoms related to hypersensitivity of the CNS that include respiratory, gastrointestinal and autonomic symptoms.

- Goals of non-pharmacologic care are to reduce symptoms, promote growth & development, and promote supportive social interactions.

- Categories of non-pharmacologic NAS interventions reviewed:
  - Developmentally supportive care
  - Family Engagement
  - Feeding

Developmentally Supportive Interventions for NAS Infants

Sue Horner, MS, APN/CNS, RNC-NIC

Overview of Literature Review

- Reviewed 24 articles related to Neonatal Abstinence Syndrome and Non-Pharmacologic Management
- Developmentally supportive interventions have not been well studied in the NAS population.
- Some evidence is available from other neonatal populations including preterm infants.

Environmental Modifications

1. Reduced or modified environmental stimulation
   - Dim lights
   - Reduced sounds
   - Introduction of gentle environmental light & noise as infant prepares for home
   - Provides sensory support for infant

2. Cohorting NAS patients
   - Trained staff
   - Reliability of assessments

McGuire, 2014
Nelson, 2016
Reddy, et al, 2017

Protected Sleep

1. Clustering of infant's care to allow for uninterrupted periods of sleep
   - Sensory support
   - Supports feeding & weight gain
   - Reduces irritability
   - Supports development

2. Care/feedings occur when infant wakes on his own vs scheduled care

3. Sleep is supported by Kangaroo Care

Hiles, 2011

MacMullen, 2014

Stress Assessment & Management

1. Attention to cues & responses to determine needs
   - Individualize care including soothing techniques
   - Individualize environment
   - Individualize social interactions

2. Consistent care team supports “learning the baby”

Jansson & Velez, 2012

Nelson, 2016

Comfort Care

1. Swaddling vanSleuwen, et. al., 2007
   - Reduces crying time for Opioid Affected infants
   - Increased amounts of deep sleep
   - Improved self-regulatory ability
   - Less pain during heel lance

2. Holding & Rocking
   - Rocking bed not effective

3. Non-nutritive Sucking

4. Kangaroo Care
   - Meta-analysis with preterm infants increased growth measures, breast feeding & maternal-infant attachment Conde-Agudelo, et al, 2011

5. ATVV (Auditory, Tactile, Visual, Vestibular)
   - Improved behavioral state in Opioid Affected Newborns White Traut, et. al., 2002

Bagley, et al, 2014
Casper, 2014
MacMullen, et al, 2014

Alternative therapies

1. Massage
   - Reduced stress behaviors, improved weight gain & ND outcomes in studies of preterm infants

2. Music Therapy
   - RCT of 272 preterm infants - improved HR, sucking & feeding, alert states, O2 sats Loewy et al, 2013

3. Aromatherapy
   - RCT 30 term infants & mothers at bath time using lavender oil Field, et al, 2008
   - Infants slept significantly more & cried less; Infant & mother with significantly lower cortisol

4. Water beds
   - NAS pilot study – reduced need for pharmacologic treatment Oro & Dixon, 1988

5. Non-Invasive Acupuncture (NIA)
   - Study limitations – pharmacologic treatment of study NAS infants not specified

Bagley, et al, 2014
Boucher, 2017
MacMullen, et al, 2014
Maguire, 2014

Grossman et al., An Initiative to Improve the Quality of Care of Infants with Neonatal Abstinence Syndrome, *Pediatrics*, 2017.

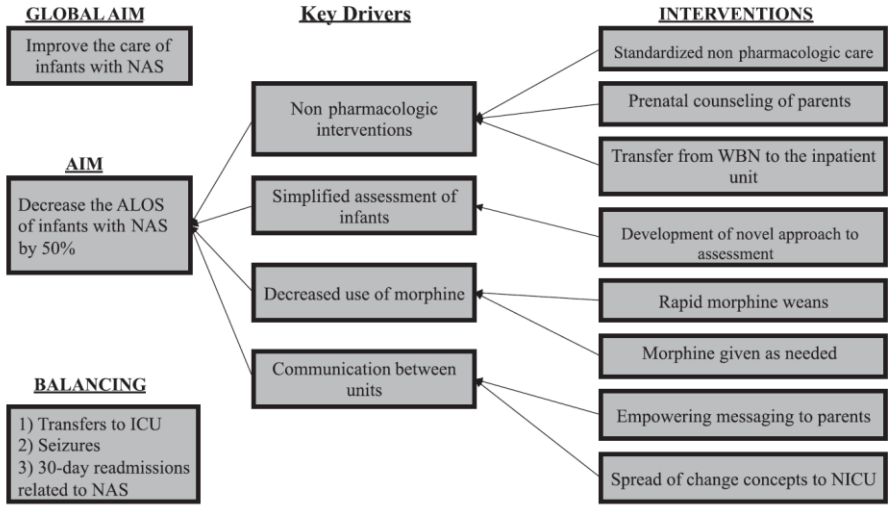


FIGURE 1
Key driver diagram for NAS quality improvement project.

Grossman et al., An Initiative to Improve the Quality of Care of Infants with Neonatal Abstinence Syndrome, *Pediatrics*, 2017.

- Implemented a simplified approach to assessment & standardized four non-pharmacologic therapies including:
  - Low stimulation environment
  - Staff engaged parent continuously in care
  - Staff trained to view non-pharm as equivalent to medications
  - Encouraged breast feeding

- Changed led to substantial and sustained decreases in ALOS, the proportion of infants treated with morphine, and hospital costs with no adverse events.

Summary

- Developmentally supportive interventions are consistently recommended in the literature for the continuous support of NAS infants.

- Non-pharmacologic supportive interventions may help the infant avoid pharmacologic management and may promote earlier discharge.

- There is a lack of evidence supporting many of these interventions for NAS infants.

Family-Centered Care for NAS Patients

NAS Non-pharmacologic Treatments

Meg Behm, MSN, APN-CNS, RNC-NIC

Advocate Children's Hospital, Park Ridge

Overview of Literature Review

- Reviewed 14 articles that looked at “family-centered”, “parental presence”, and ”rooming-in” for NAS infants
- Outcomes measures included LOS, length of pharmacologic treatment, and mean Finnegan scores
- Three emergent themes repeated in these articles:
  - Family-centered care has a positive effect on the outcome measures listed above
  - Staff education is needed in order to create and support family-centered care
  - Parental education is needed prenatally through infant discharge in order for family-centered care to be most effective
- Additional article looked at maternal experiences during the hospitalization of their NAS infant; 4 themes emerged from this qualitative research (understanding addiction; feelings of guilt; being judged by nurses; trusting nurses)

Howard et al., **Impact of Parental Presence at Infants' Bedside on Neonatal Abstinence Syndrome**, *Hospital Pediatrics, 7 (2), 63-69, February 2017*

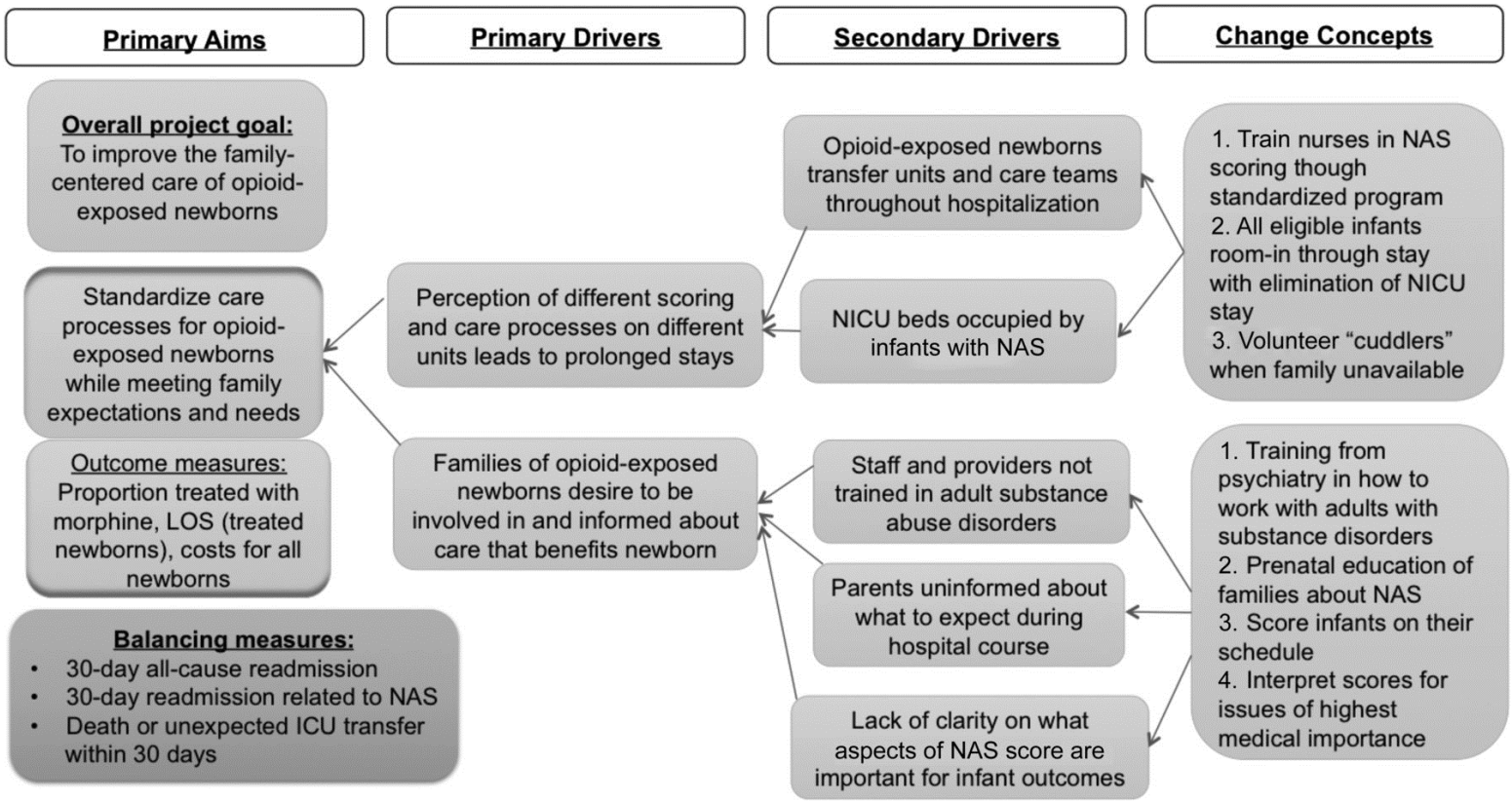
- Retrospective, single-center cohort study on infants being treated for NAS using a rooming-in model of care (Boston Medical Center)
- 86 Mom-Infant Dyads
- Demographic data and parental presence at bedside
- Outcomes: LOS, extent of pharmacotherapy, mean Finnegan score
- Non-ICU setting utilized (model utilized for > 15 years!)
- Mean amount of parental presence 54% of infant hospitalization
- Parental presence associated with up to 9 days shorter LOS and 8 fewer days of opioid therapy (when parent present 100% of stay)
- Adjusted for the variable of breastfeeding

Holmes et al., **Rooming-in to Treat Neonatal Abstinence Syndrome: Improved Family-Centered Care at Lower Cost,** *Pediatrics, 137(6), e1-9, 2016*

- Plan-do-study-act (PDSA) cycles at Children's Hospital - Dartmouth
- Multidisciplinary quality improvement team approach
- Outcomes: A standardized NAS program safely reduces LOS, hospital costs, and pharmacologic therapy.
- NICU beds can be eliminated for NAS treatment
- Key Driver Diagram next slide

- Rooming-in model **decreased**:
  - LOS to 12 days
  - Pharmacotherapy rate to 27%
  - System costs by ½
- Financial **downside** to rooming-in treatment:
  - Less revenue from fee-for-service
  - Less revenue from NICU bed costs
  - Less morphine costs
- Financial **upside** to rooming-in treatment :
  - Rooming-in provides cost savings to Medicaid and taxpayers.

From Holmes et al 2016



Newman et al., **Rooming-in care for infants of opioid-dependent mothers**, *Canadian Family Physician, 61, e555-561, 2015*

- Program implementation & evaluation at Kingston General Hospital, Ontario
- Implemented a rooming-in program to support close contact between the NAS infant and opioid-dependent mother
- Results of rooming-in:
  - Medication treatment decreased from 83.3% to 14.3%
  - LOS decreased from 25 days to 8 days
- Outcome: Moms participating rated the experience favorably

- Clinical practice tips:
  - Moms in the rooming-in program were seen at least once in a multidisciplinary clinic
  - Moms received antenatal education about NAS and rooming-in goals
  - The mom's social risk factors were identified; 3 of 24 moms were not eligible for program (child-protective services)
  - Moms were given access to a community-based primary care person for support (title of primary care person not identified)
  - Mother-infant dyads were admitted to a Pediatrics Unit; infant went to NICU if opioid treatment required

Cleveland & Bonugli, **Experiences of Mothers of Infants with Neonatal Abstinence Syndrome in the Neonatal Intensive Care Unit**, *JOGNN, 43(3), 318-329, 2014*

- Qualitative descriptive study of 15 Hispanic, substance addicted mothers of infants with NAS from a community-based, out-patient, addiction treatment facility in large urban area in Southwestern US
- Semi-structured individual interviews
- Qualitative content analysis; themes emerged

- Four themes identified
  - Mothers and nurses lack of ***understanding addiction***
  - Feelings of guilt when watching the ***infant withdraw***
  - Feeling ***judged*** by nurses for using drugs during pregnancy
  - Above interfered with parent's ability to ***trust nurses***
- Implications for prenatal counseling/education for families
- Implications for healthcare team education

Common Themes for Family-Centered Care

- Rooming-In (parental presence)
  - Dedicated space outside of a typical NICU (hospital layout may be a barrier)
  - Decreased LOS, decreased pharmacologic treatment, non-ICU bed cost may have a negative impact on hospital revenue
- Staff Education related to Family-Centered Care
  - Understanding addition
  - Judgement/compassion/positive reinforcement to parents/building trust
  - Finnegan tool consistency
  - Team approach (OT, PT, Lactation, Pharmacy, Parents/Caregiver, Primary Care Provider, Volunteers)
- Parent Education related to Family-centered Care
  - Prenatal focus (understanding addiction, NAS, expectations during rooming-in, social risk factors identified, primary care support person or clinic)
  - Ongoing education during stay (well newborn care, calming techniques, etc.)

Who can breastfeed and why?

Leslie Caldarelli, MD

- Breastfeeding is safe for mothers using methadone and buprenorphine
- BM contains minimal amounts of methadone and buprenorphine
- The amount is too small to treat NAS
- Sudden discontinuation is not associated with worsening NAS, however gradual weaning is advised
- High concentrations of hydrocodone and oxycodone in BM, as well as reduced clearance in neonates warrants that mothers be alerted to the possible sedation effects

- Breast feeding is indicated unless there is maternal ongoing illegal drug use, positive HIV status, or polysubstance use.

The Benefits of Breastfeeding

- Breastfeeding increases bonding, enhances maternal confidence, and encourages active participation in parenting
- Breastfeeding may decrease the incidence of NAS, the need for pharmacologic treatment, and length of stay

How do we improve?

- Identify nursing, lactation, SW, physician champions
- Involve L & D stakeholders
- Advocate for couplet care
- Establish nursing policies and practice guidelines

Resources

- Mark L. Hudak, Rosemarie C. Tan, The Committee on Durgs, The Committee on Fetus and Newborn. Pediatrics, February 2012.
- Welle-Strand GK, Skurtveit S, Jansson LM, Bakstad B, Bjarkø L, Ravndal E. Breastfeeding reduces the need for withdrawal treatment in opioid-exposed infants. Acta Paediatr2013;102:1060-1066
- Jansson LM, Academy of Breastfeeding Medicine Protocol Committee. ABM clinical protocol #21: guidelines for breastfeeding and the drug-dependent woman. Breastfeed Med. 2009;4(4):225–228pmid:19835481
- ABM Clinical Protocol #21: Guidelines for Breastfeeding and Substance Use or Substance Use Disorder, Revised 2015
- Kocherlakota, P. Neonatal Abstinence Syndrome. Pediatrics, August 2014.

MNO Literature Review Updates

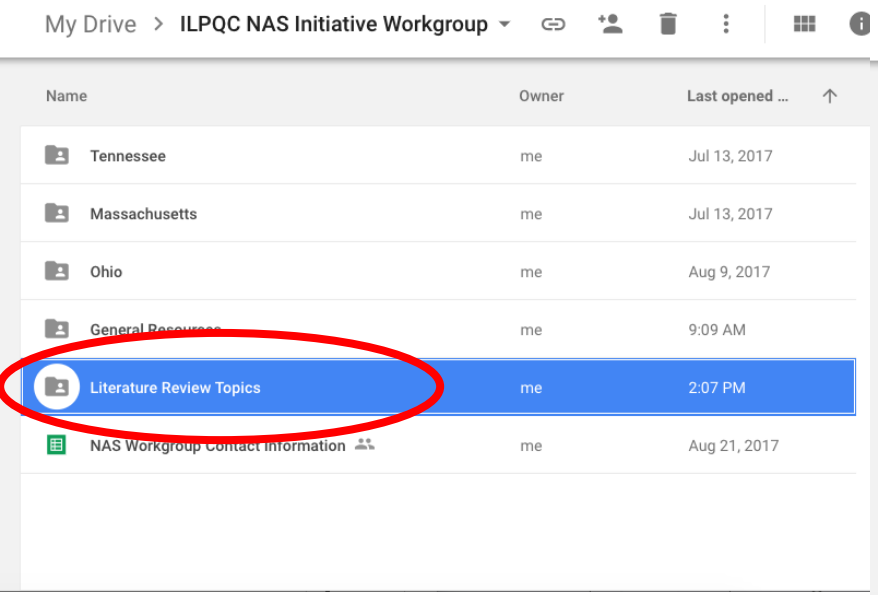
- All lit review groups (team lead and group members) have been emailed
- Team Leads: Email your group members and divide up the work
- Slides are due a week before your group presents
- ILPQC will email a reminder to the team lead a month before your slides are due
- Limit presentations to about 10 minutes, present summary recommendation slide at the end
- Groups are listed on the next slide

Literature Review Groups

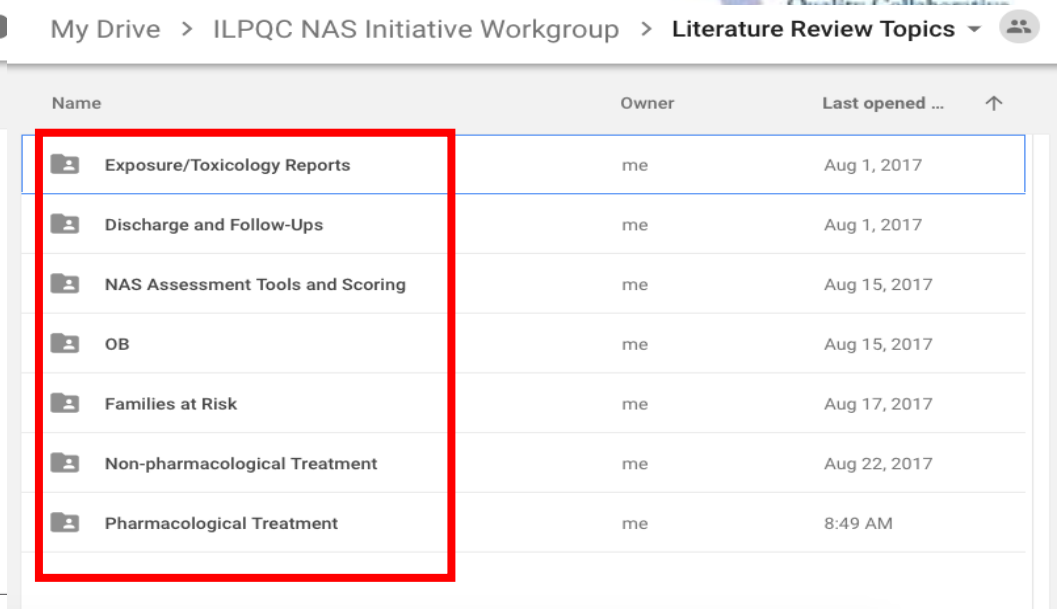
Topic	Month	Group Leader	Group Members
Families at Risk	Aug.	Terry Griffin	Elaine; Maliha
OB	Sep.	Carol Burke	Sherry; Barbara; Jaye; Tamara
Exposure/Toxicology	Sep.	Rita Brennan	Lisa; Steve
NAS Assessment Tools	Oct.	Mary Puchalski	Mary; Phyllis; Steve; Chris
Non-Pharma Treatment	Oct.	Sue Horner	Leslie; Meg
Pharma Treatment	Nov.	Venkata Majjiga	Ann; Chris
Discharge and Follow Up	Nov.	Kenny Kronfrost	Donna; Elyssa; Jennifer

Literature Review Google Drive

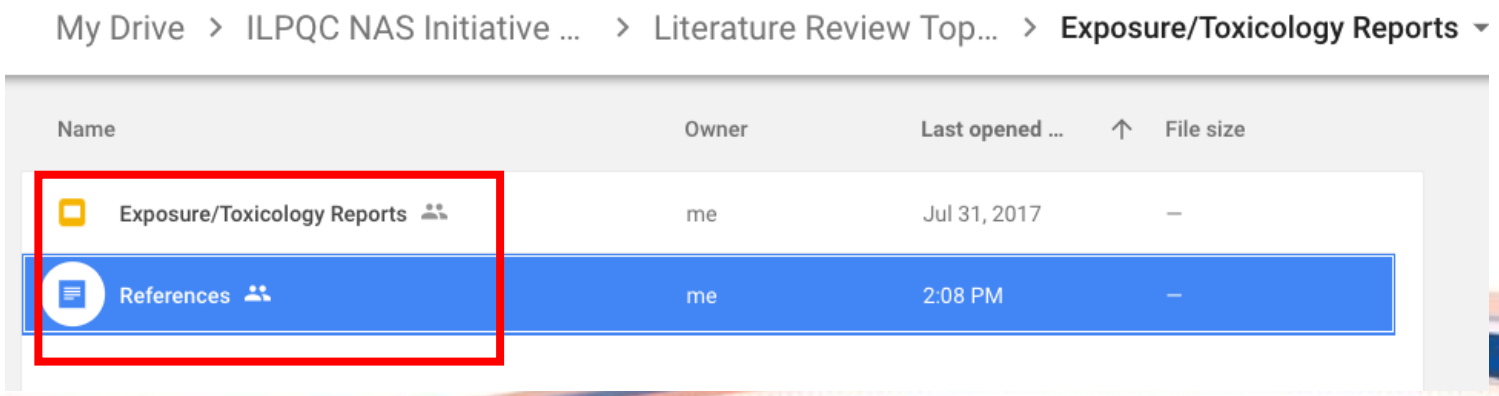
1. ILPQC NAS Workgroup Google Drive



2. Literature Review Topic Folders



3. Inside Lit Review Folder: References & Slides



Literature Review Resources

- Look at the resources in the Google Drive
  - Resources have been pulled from other state's toolkits
- Review national professional guidelines and resources from SAMSHA, CDC, ACOG, AAP
- Questions: email info@ilpqc.org
- https://drive.google.com/drive/folders/0B9NgXbOG8bl0X2Y1dmNwY054NHM?usp=sharing

Next Call: November 20th, 2017

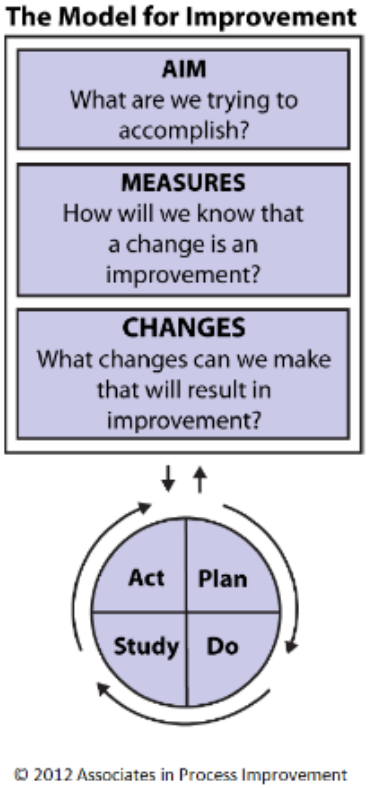
1:00pm-2:00pm

What is Quality Improvement?

Quality Improvement consists of systematic and continuous actions that lead to measurable improvement in health care services and the health status of targeted patient groups.

IOM Aims for Improvement

- Safe
- Timely
- Effective
- Efficient
- Equitable
- Patient-Centered



Hospital QI Work:

What changes can you make to a process/system and test with a PDSA cycle to reach initiative goals?

The Model for Improvement

AIM
What are we trying to accomplish?

MEASURES
How will we know that a change is an improvement?

CHANGES
What changes can we make that will result in improvement?

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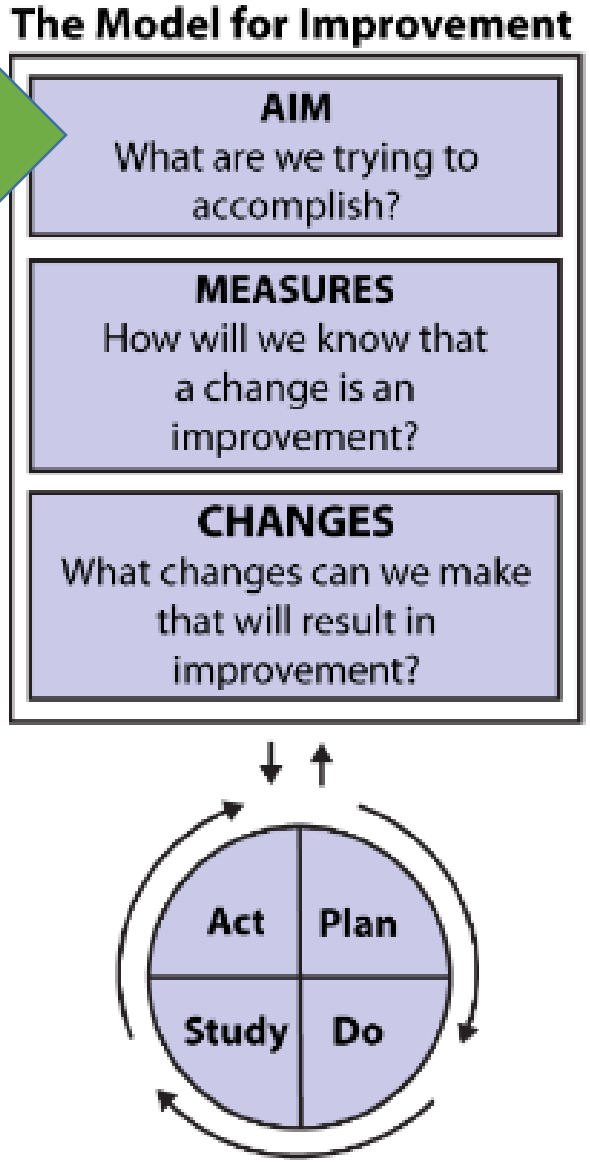
Question 1

Set your aim



SMART AIMS

S	Specific
M	Measureable
A	Actionable
R	Relevant
T	Time bound

- By Decemeber 1, 2017, 95% of health care providers at General Hospital will be immunized against Influenza.
- By October 15, 2017 Superior Clinic will increase by 40% the number of school- aged children with a BMI documented in the EMR.

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THANKS TO OUR SPONSORS

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IHA Illinois Hospital Association

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