The Ability of SNOMED CT to Capture Perinatal Process Concepts

Catherine H. Ivory, PhD, RN, BC

The State of Perinatal Care

- More than 4 million annual births
- Annual cost approximately $16 billion
- Current issues:
  - National focus on safety and quality
  - Increased medical intervention
- Tools to assess perinatal quality, such as P-FTR

Perinatal Data

- Complex medical records

- Customizable electronic systems

- No comprehensive source of perinatal data for research or quality assessment

Healthcare IT Agenda

- Meaningful use
  - Reimbursement vs. penalties
  - Focus on quality
  - Standards for electronic documentation
    - Use of standard terminologies

Standard Nursing Terminologies

- 12 are ANA-approved
- None widely deployed
- Little concentration on perinatal nursing concepts
  - Little identified research on standard language use in perinatal nursing

Failure to Rescue for Perinatal Care

- AHRQ endorsed process measurement tool
- Only 1 published study using the tool
  - Noted limitation inability to retrieve data
- Processes measured in 3 areas:
  - Expectations for careful monitoring and timely identification (of problems)
  - Appropriate interventions
  - Timely activation of a team response

**Evaluating Appropriate Responses to Clinical Situations based on
AHRQ's (2003) *Failure to Rescue* Patient Safety Indicator (Adapted to Perinatal Care)**

Rescue Process for Nonreassuring (Indeterminate / Abnormal) Fetal Heart Rate Patterns					
Rescue Process Components	Yes	No	UTBD	NA	Comments/Additional Descriptions of Processes
Expectations for careful monitoring					Includes characteristics of FHR patterns and uterine activity
For women/fetuses without identified risk factors					
Every 30 min during the active phase of first stage labor					% of 30 min time frames with assessment data
Every 15 min during the active pushing phase of second stage labor					% of 15 min time frames with assessment data
For women/fetuses with identified risk factors					
Every 15 min during the active phase of first stage labor					% of 15 min time frames with assessment data
Every 5 min during the active pushing phase of second stage labor					% of 5 min time frames with assessment data or summary notes q 15 min indicating continuous bedside attendance and assessment during pushing
Score	0		1		2
Timely identification					
Within the timeframe outlined in the expectations for careful monitoring (e.g. q 30 min, 15 min or 5 min based on identified risk factors)					Time:
Accurate interpretation and appreciation of the implications of the clinical data displayed (based on agreement between medical record documentation and fetal monitoring strip)					Time:
Nonreassuring (indeterminate/abnormal) characteristics of the FHR pattern	List characteristics:				
Score	0		1		2

Kathleen R. Simpson, PhD, RNC, FAAN

Research Questions

- What are consensus definitions of the elements included in P-FTR?

- Can P-FTR elements be mapped to four ANA-recognized standard languages?

Study Design

- Exploratory study, with mixed methods
- Phase I: consensus definitions for P-FTR
  - Modified Delphi study
- Phase II: cross-mapping of defined P-FTR elements to ANA terminologies
  - Validation by expert panel

Results

- 29 participants in Phase I, 27 completed all three study rounds

  – 27 submitted demographic information

- At least 75% consensus on most P-FTR elements. Noted exceptions:

  – Laterality, provider notification, MVUs, documentation of non-reassuring fetal status

Phase II

- P-FTR elements (defined in Phase I) mapped to 4 nursing terminologies
  - Clinical Care Classification™ (CCC)
  - International Classification of Nursing Practice (ICNP®)
  - Logical Observation Identifiers, Names, & Codes (LOINC®)
  - Systemized Nomenclature of Medicine-Clinical Terms (SNOMED-CT®)

Rationale for Terminology Selection

- Previous use in nursing informatics research

- Defined semantic structure

- Specific search strategy

- Ability to access at no charge for research purposes

Cross-Mapping Results

- 76 individual concepts mapped
  - 63 (> 80%) in SNOMED-CT
  - 26 in ICNP
  - 21 in LOINC
  - 11 in CCC

Expectations for Careful Monitoring/Timely Identification

- 58 total concepts
- Consensus definitions for:
  - High and low risk maternal and fetal characteristics
  - Use of NICHD terminology
  - Uterine monitoring characteristics
  - Active labor elements
- No consensus for:
  - Terms to describe non-reassuring fetal status
  - Use of MVUs to describe contraction strength

Notable SNOMED Findings

- Hyperstimulation vs. tachysystole
- "Reassuring" as an intervention rather than a clinical finding
- NICHD Categories
- The concept of gestation

Appropriate Intervention

- 13 concepts
- Consensus definitions for:
  - Oxygen administration
  - IV bolus
  - Discontinuation of Oxytocin
  - Administration of Terbutaline
  - Amnioinfusion
  - Modified pushing efforts
- No consensus for
  - Laterality, provider notification

Appropriate Intervention

ID	Concept	Value	Column1	Code	Definition Code	Definition	Type	Column2	Column3	Column4	Column5
Intrauterine Resuscitation											
	Turning patient			359962006	475573019	turning patient in bed	procedure				
	Lateral Positioning	Right		24028007	40331016	right lateral	qualifier value		also code for left side, right side		
	Lateral Positioning	Left		7771000	13854010	left lateral	qualifier value				
	IV Bolus	Y/N		431393006	2770055011	administration of intravenous fluid bolus	procedure				
	Lactated Ringers Solution	mL		347379006	2470253016	Lactated Ringer's solution	pharmaceutical/biologic product				
	Prostaglandin			codes for most are present							
	Prostaglandin D/C	Y/N		395008009	1488708011	medication stopped-contra indication	situation with explicit context				
	Oxytocin D/C			131032006	210696010	Oxytocin	pharmaceutical/biologic product				
	Oxytocin D/C	Y/N		395008009	1488708011	medication stopped-contra indication	situation with explicit context				
	Oxygen	L/min		57485005	95596013	oxygen therapy	procedure				
	Amnioinfusion	mL/hr		236956008	355155013	amnioinfusion	procedure				
	Terbutaline SQ			374631006	1774007019	terbutaline sulfate 1mg/1ml solution	pharmaceutical/biologic product				
	Terbutaline SQ	mg./mcg.		32282008	53934012	subcutaneous injection	procedure				
	modified pushing efforts	Y/N									

Activation of Team Response

- 5 Concepts

- Consensus definitions for:
  - Notification of provider
  - Decision for cesarean section
  - Notification of transport team

Activation of Team Response

Name	Value	Column1	Code	Definition Code	Definition	Type
Provider Notification	Y/N		428426009	2695565017	notification of physician	procedure
Time notified	time		410669006	2472323016	time	qualifier value
Time Arrived	time		410669006	2472323016	time	qualifier value
C/S called	Y/N		274130007	2154892010	emergency cesarean section	procedure
Transport/Transfer Team notified	Y/N					

Expert Panel Validation

- Perinatal and informatics nursing experts
  - P-FTR author
  - Perinatal nurse participant from Phase I
  - Informatics nurse with perinatal clinical experience
  - Representative from SNOMED-CT responsible for perinatal content
  - Nursing informatics researcher with expertise in standard terminologies

Validation Sessions

- Mapping results sent to experts one week in advance

- Scheduling facilitated by Doodle®

- Virtual meetings facilitated by SCOPIA

  - Webcam and headset provided to panel members on request. Support through VICTR

Expert Panel Validation

- Participants asked to validate findings for:
  - Accuracy
  - Context
- 100% of findings validated, without exception

Implications

- SNOMED-CT may best represent P-FTR elements

  - Most elements related to intrapartum care are present

- Standardization essential for data retrieval and benchmarking

Next Steps

- Formal request to SNOMED-CT for incorporation of missing P-FTR elements

- Pilot testing for the ability to retrieve concepts from existing EDW

- Modeling and testing of P-FTR in electronic system
  - real time use of P-FTR for decision support
  - Process measurement vs. process validation tool

- Similar study format for other perinatal nursing elements

Questions?