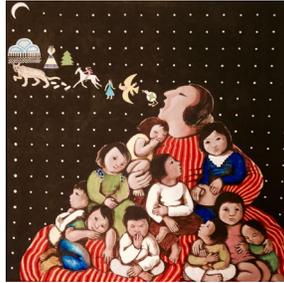


White Paper



**First Fragile Infant Forum for Integration of Standards:
Feeding, Eating, and Nutrition Delivery
Monrovia, CA
July 13-15, 2022**

**based on the
Recommended Standards, Competencies and Best Practices for Infant and Family Centered
Developmental Care in Intensive Care**

August 2022

White Paper Prepared by:

Carol Jaeger, DNP, RN, NNP-BC

Joy Browne, PhD, PCNS, IMH-E

Carole Kenner, PhD, RN, FAAN, FNAP, ANEF, IDFCOINN

Erin Ross, PhD, CCC-SLP

Forum Planning Committee

Joy V. Browne, PhD, PCNS, IMH-E

Carol Jaeger, DNP, RN, NNP-BC

Erin Ross, PhD, CCC-SLP

Mitchell Goldstein, MD

On behalf of the faculty and participants of the First FIFI-S Forum on Feeding, Eating, and
Nutritional Delivery

Table of Contents

Overview:

Introduction	4
Summary of Forum Content and Process.....	5

Process Oriented Approach for Implementation:

Implementation Science	6
Systems Thinking	6
Systems Thinking in Healthcare	6
Systems Thinking in Implementation of IFCDC	7
IFCDC Principles and Concept Model	7
Focus on Clinical Practice for Implementation of IFCDC Standards	8

Step by Step Guide to Implementation of IFCDC Standards for FEND:

Continuous Improvement as a Systems Thinking Process	8
Operational Business Plan vs. Strategic Plan	9
Motivating the Interprofessional Team to Engage in Change	10
Measuring the Change	11

Tools of the Continuous Quality Improvement Process:

Assessment	12
Gap Analysis	12
Measures and Metrics	13
Logic Model	17
Fishbone Diagram	20
Planning	24
Plan-Do-Study-Act (PDSA)	24
Key Driver Diagram	25
Implementation	27
Executing the Implementation	27
Monitoring the Implementation	28
Maintenance	28
Evaluation	28

Lessons Learned	28
Playbook/Storybook.....	28
Dissemination and Publication	29
Sustainment	30
Summary	30
FIFI-S Faculty and Contributors to the White Paper	30
Acknowledgements	31
Conflict of Interest Statement	31
References	32
Appendices	35
A – Gap Analysis Template	35
B – Logic Model Template	55
C – Fishbone Diagram	56
D – P-D-S-A Template	57
E – Key Driver Diagram	58

**White Paper
For the**

**First Fragile Infant Forum for Implementation of Standards:
Feeding, Eating, and Nutrition Delivery**

**Monrovia, CA
July 13-15, 2022**

Overview

Introduction

The Gravens Conference, first established by Dr. Stanley Graven and colleagues, focuses on the Environment of Care for High Risk Newborns and their Families. “The Gravens” is known for its leadership in not only NICU design but also Infant and Family Centered Developmental Care in order to optimize the outcomes of babies in intensive care. Under the umbrella of the Gravens conference, NICU design standards were developed with the leadership of Dr. Robert White. The design standards have provided guidance to medical and architectural professionals and parents as they collaborate to build new and/or redesign intensive care units. They provided evidence for the impact of the sensory environment of newborns and thus contributed to better outcomes for babies and their families.

As the field of Infant and Family Centered Developmental Care (IFCDC) has advanced, its approaches are integrated into current intensive care policies and procedures. In parallel, research emerged to support a variety of practices to modify the caregiving environments for babies and their families in intensive care. The evidence is strong enough for a Gravens interprofessional panel of leaders to converge and identify significant constructs represented in IFCDC and gather evidence to support practice.

Once evidence is identified, implementation strategies using a systematic approach need to be articulated and disseminated. The Gravens consensus panel, as they continued to accumulate evidence and further articulate standards, competencies and best practices for IFCDC in intensive care, identified a need to develop and disseminate information about how to implement the standards. As result, a series of Fragile Infant Forums for the Implementation of Standards (FIFI-S) has been initiated to assist intensive care professionals to not only understand the evidence available for IFCDC practice, but also to know how to successfully integrate the standards into intensive care and hospital systems. Without systems integration, IFCDC practices, along with adherence to the standards, cannot be successfully accomplished.

In July 2022 the First Fragile Infant Forum for the Integration of Standards (FIFI-S) provided an opportunity for interprofessional leaders, providers, caregivers, parents, and educators to focus on the Feeding, Eating and Nutrition Delivery (FEND) standards, and to learn, discuss, and plan

implementation strategies. The 2-day conference (virtual and in-person) afforded participants the opportunity to engage in dialog about how systems (for both organization and unit levels) impact interventions at the bedside. Evidence underlying the FEND standards was reviewed, gaps in knowledge identified and discussion ensued regarding strategies for examining how best practices can be implemented. Using evidence-based continuous quality improvement (CQI) tools and change theory, participants outlined how Feeding, Eating and Nutrition Delivery standards could be implemented successfully in Intensive Care Units (ICU).

Feeding, eating, and nutritional delivery standards are critical to the optimal development of the infant and family. Implementation of these standards in intensive care is essential to improve baby and family outcomes. The FEND domain is one of six sets of evidence-based standards, competencies and best practices identified by an interprofessional committee to support an Infant and Family Centered Developmental Care (IFCDC) framework.^{1,2,3} The framework, along with each of the six domains, represents evidence-based standards and competencies for newborn intensive care practice.⁴ The Recommended Standards, Competencies and Best Practices for Infant and Family Centered Developmental Care (IFCDC) in Intensive Care, can be accessed at <https://nicudesign.nd.edu/nicu-care-standards/>.

This White Paper is the product of the first FIFI-S Forum with the Focus on the IFCDC Standards for Feeding, Eating, and Nutritional Delivery of Newborns in Intensive Care

Summary of the Forum Content and Process

The primary topics of the First FIFI-S Forum highlighted systems thinking in complex adaptive systems to outline the context and flow of implementation. The standards for management of feeding, eating, and nutritional delivery of the newborn provided the evidence base for practice. Sharon Cox offered an inspirational invitation to participants, and a challenge to develop continuing improvement of care within their clinical units.

Dr. Erin Ross provided an overview of the standards on feeding, eating, and nutritional delivery for the newborn, emphasizing the importance of their impact on the long-term outcome for babies and their families. Drs. Pamela Dodrill, Kelly McGlothen-Bell, Britt Pados, and Erin Ross presented clear evidence for oral feeding strategies, breastfeeding, and the important role of parents in using the behaviors of their baby to lead successful and joyful feeding in the short- and long-term. The evidence and expertise of these presenters provided the foundation for the work conducted during the forum.⁵

Drs. Carol Jaeger and Carole Kenner, and Debra Paul, used IFCDC systems thinking standards and the CQI process and tools to guide the planning and development of the competent practice of feeding, eating, and nutritional delivery in the ICU. Examples of practice changes in the Neonatal Intensive Care Unit (NICU) at Children's Hospital Colorado, Aurora, CO, and Lurie Children's Hospital of Chicago, Chicago, IL, were shared in the presentations to describe successful implementation of the FEND standards.

Forum participants collaborated with and were guided by an evidence expert and systems expert in each of four (4) workgroups to plan and develop exemplars of practice change initiatives for four of the FEND (4) standards. These four standards then were used strategically to support practice improvement in the participants' respective units, implemented, and evaluated.

Following Sections Detail the Process Oriented Approach used at the Fragile Infant Forum for Implementation of Standards to Engage Participants in Implementation Process.

Implementation Science –Provides an approach to operationalizing evidence into practice. Implementation science uses methods to systematically integrate research and experiential clinical evidence to improve the quality and effectiveness of health practice. In the IFCDC section of feeding, eating and nutrition delivery are 11 standards and a total of 50 competencies articulated that are supported with an extensive evidence base. Obviously, it can be challenging, confusing, and dysfunctional, to implement all the standards and competencies at once. So, the tools and process of implementation science served as a guide to drill-down to the priority initiatives that can improve the quality of baby and parent FEND experience and outcome in an individual unit. As a result, Systems Thinking is an approach to guide the successful identification of the parts of the system, their relationship to each other, and the implication of change to one or more parts of the system. *Systems thinking must be addressed prior to the development of an implementation plan for any IFCDC domain.*

Systems Thinking – Systems thinking is used to assess the components/parts of a whole, a human or an organizational system, and the way they relate to each other to make the system function as it is intended

Systems Thinking in Healthcare – System components in Health care should readily relate to each other.

The first standard of the Systems Thinking section of the “Report of the First Consensus Conference on Standards, Competencies and Best Practices for Infant and Family Centered Developmental Care in the Intensive Care Unit (ICU)”, <https://nicudesign.nd.edu/nicu-care-standards/>, states the following:

“Standard 1, Systems Thinking: The intensive care unit shall exhibit an infrastructure of mission, vision, values, leadership, and a governance framework to guide the performance of the collaborative practice of IFCDC.”¹²

The mission of the ICU should be baby- and family-centered. The vision of care should reflect the centrality of the baby and the parent. The values of caregiving behavior include the principles of infant and family centered developmental care (IFCDC) that are evidence-based, standardized, safe, and competent, and are reflected in both the leadership and governance of the ICU. As a result, care can be provided within a culture that is inviting, respectful, inclusive, and accountable. The environment will be welcoming and comfortable with space for parents to be parents of their baby. The practice of IFCDC shares education, planning, decision-making,

and evaluation with parents. The infrastructure designs roles, guidelines, policies, and procedures that are evidence-based and reduces performance variability. Outcomes should reflect optimum short-term and long-term neuro-biophysiological and psychosocial wellbeing of the baby and family.

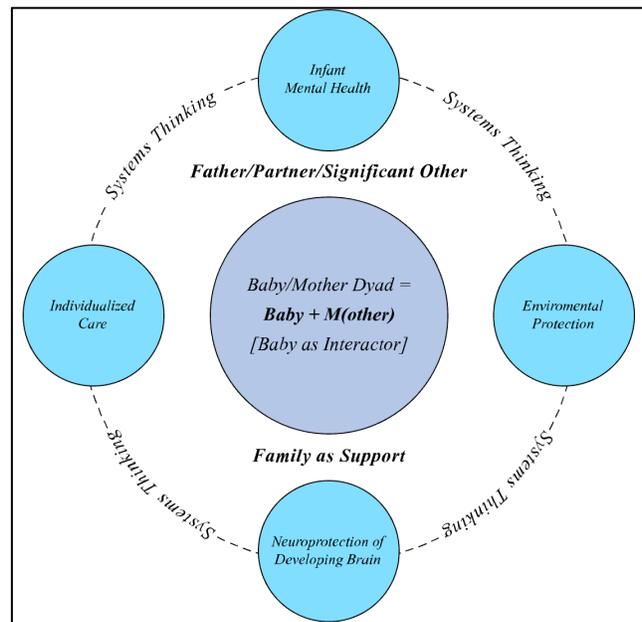
Systems thinking in implementation of IFCDC

For IFCDC, a relatively new approach to the care of babies and families in intensive care, it is essential to understand the concept in order to be successful in implementing evidence-based standards. Health professionals and parents/family collaborate to use systems thinking to examine the influence and interaction of the baby, parents, caregivers, health practices, and environment within the complex, dynamic, and continually evolving system of the ICU to benefit the optimal outcome of the baby and family through the lifespan. The application of implementation science and articulated methods by the healthcare team and parents drive change using strategies to better serve the baby and family. ^{6,7,8,9,10,11}

Systems thinking is the foundational standard that is infused into all components of the IFCDC guiding principles, as demonstrated in the concept model, shown below. Further guidance for a systems thinking, step by step approach follows.

IFCDC Principles and Concept Model:

- Systems thinking in complex adaptive system
- Individualized care
- Family involvement
- Environmental protection
- Neuroprotection of developing brain
- Infant mental health
- Baby as a competent communicator & interactor



Consensus Committee on Infant Family Centered Developmental Care. Gravens Conference Workshop: Recommended Standards, Competencies and Best Practices for Infant and Family Centered Care in the Intensive Care Unit. 2017 & 2020. ¹³

A focus on clinical practice for implementation of IFCDC standards

The practice sections of the Recommended Standards, Competencies and Best Practices for IFCDC in Intensive Care have been articulated from the perspective of evidence-based areas of IFCDC practice, the foundation of which is systems thinking standards, infused into each of the five (5) practice sections, as follows:

- **Systems thinking** in complex adaptive systems – applies to all practice areas of the IFCDC Standards
 - **Reducing and managing pain and stress** in newborns and families
 - **Positioning and touch** for the newborn
 - **Sleep and arousal interventions** for the newborn
 - **Skin-to-skin contact (KMC) contact** with intimate family members
 - **Management of feeding, eating, and nutrition delivery** for the newborn

The initial Forum of interprofessional healthcare professionals focused on systems thinking regarding the **management of feeding, eating, and nutrition delivery** for the newborn.¹⁴ Forum faculty guided the interprofessional participants in the use of systems thinking and continuous quality improvement strategies, process, and tools designed to affect change and evidence-based practice improvement using the IFCDC Standards, Competencies, and Best Practice for the ICU.¹⁵

A Step by Step Guide to Implementation of IFCDC Standards for FEND using Continuous Quality Improvement (CQI), Operational Business Plans, Motivational Strategies for the Health Care Team and Strategies to Measure Progress

Continuous Improvement as a Systems Thinking Process – Continuous improvement uses systems thinking to guide assessment, planning, implementation, and evaluation.

Continuous quality improvement (CQI) is a real-time journey – a process to – do things better today than yesterday. Avedis Donabedian defined CQI in healthcare as *patient + structure + process = outcome*.^{16,17}

Systems thinking uses evidence and continuous improvement to address the advancement of healthcare, rapid evolution of technology, and changing needs of babies, parents, and families. The process includes the following steps:

- Engage in continual review of evidence.
- Assess the ICU to identify gaps between evidence and the current state of your ICU vision, values, strategic plan, infrastructure, policies, practices, outcome data, performance competencies, satisfaction data. Use improvement tools to visualize and monitor the process.

- Be transparent by sharing data, opportunities for improvement, and projected/potential outcome for babies, parents, family, and staff.
- Engage interprofessional stakeholders/team and collaborate with them in the change process.
- Identify change champions/team leaders.
- Plan and prioritize change strategies using tools such as a
 - gap analysis,
 - logic model,
 - Strengths-Opportunities-Aspirations-Results (SOAR) Analysis,
 - Fishbone (cause and effect) Diagram,
 - Aim-Measure-Change Ideas Model,
 - Plan-Do-Study-Act (PDSA) Diagram,
 - Key Driver Diagram, and/or
 - Process Map and/or Algorithm
 - Run Charts/Graphs.
- Develop an operational business plan, as needed, to articulate the gap, planned change, and projected cost-to-benefit ratio by managing a change.
- Identify measures/metrics and compare/evaluate the data compared with the evidence and standardized data of similar ICU services, i.e., outcome(s), professional performance, and professional/parent satisfaction results.
- Standardize education, performance competency, and evaluation measures for all interprofessional caregivers, providers, parents, and managers.
- Mentor performance and validate competency.
- Monitor influencing factors, such as biological agents, health and socio-economic consequences, medications, supplies, and equipment; and plan strategies to constructively manage process impediments, challenges, and barriers.
- Adjust and change strategies, changes, and measures, as needed, to standardize the evidence-based practice in the unit.
- Celebrate success – small steps/initiatives through the process! ^{18, 19,20}

Operational Business Plan vs. Strategic Plan – What is an operational business plan and why is it needed? How is it different from a strategic plan?

A Business Plan may be expected by organizations when the change/improvement initiative involves a change to the marketing of services or size of the service area. The business plan provides a feasibility plan for the development, execution, timeframe, cost analysis, and short- and long-term impact – benefits, disadvantages, and risks – of a change/improvement initiative/project. The plan should include the strong evidence base of the change/improvement/project, the clearly articulated value to the clients and the organization, the principles that guide the proposed project, the operational structure, infrastructure, and

budget, and the cost-to-benefit ratio over time, usually 3-5 years. The business plan should be concise and limited to a few easily read pages. ²¹

The strategic plan is different from a business plan in that it is developed on the foundation of the vision, mission, and values of the system/organization for the long-term. It is the foundation and the guide that sets the direction of the goals, performance, key performance indicators (KPIs), action plans, and function of the service area. ^{22,23,24}

Motivating the Interprofessional Team to Engage in Change – What methods/behaviors energize interest and involvement?

Motivating people to engage in change requires an understanding of human mindset and behavior. Duck describes some basic assumptions, as follows:

- Changing an organization is a highly emotional process.
- Group change requires individual change.
- No fundamental change takes place without strong leadership.
- The leader must be willing to change before others will change.
- The larger and more drastic the change, the more difficult.
- The greater the number of individuals involved, the tougher the change will be to effect. ²⁵

The leader of change is one who **works with others** to cope with the disruption and emotion of change rather than managing the complexity of change from the top down by telling others what/how to perform. Kotter recommends that leaders:

- Set a direction with others, rather than setting goals for others
- Develop a future, rather than budget for set goals
- Provide a strategic vision, rather than establish agendas and tasks
- Align people, rather than directing roles and responsibilities
- Communicate direction, rather than structure staff and jobs
- Create coalitions, rather than delegating people
- Be commitment focused, rather than monitoring and implementing results
- Motivate and inspire, rather than identifying deviations
- Leverage human value and potential, rather than planning and organizing to solve problems. ²⁶

Kotter describes behaviors that guide success through the eight (8) steps of change. The steps and behaviors are as follows:

Action	New Behavior
Step 1: Increase urgency.	"Let's go"; "We need to change"; "What's in it for me?"
Step 2: Build the guiding team.	A group forms to guide the change & work together.
Step 3: Get the vision right.	The team develops the right vision & strategy for the change effort.
Step 4: Communicate for buy-in.	People begin to see & accept the change as worthwhile.
Step 5: Empower action & remove barriers.	People begin to change & behave differently.
Step 6: Create short-term wins.	Momentum builds. Fewer people resist the change.
Step 7: Do not let up.	The vision is fulfilled.
Step 8: Make change stick.	New & winning behavior continues.

Adapted from Kotter, JP & Cohen DS. (2012). The heart of change: Real-life stories of how people change their organizations (table entitled "Eight Steps for Successful Large-Scale Change." p. 6). Boston, MA: Harvard Business School Press. ²⁷

Measuring the Change – How do we know how we are doing and if a change can make a difference? Is the difference safe, ethical, timely, quality-driven, equitable, efficient, and cost-effective?

An index, measure, and/or metric is a numeric, behavioral, or verbal indicator that describes the structure, process, or outcome that you want to monitor. Indices, measures, and metrics can be qualitative or quantitative. Monitoring a static change/improvement, dynamic movement, and/or difference over time can show the following:

- How well the current structure, process, or outcome is performing.
- If there is a problem, or the evidence-based aim is achieved.
- If there is variation in the data, process, and/or outcome.
- If a test/trial of a change initiative is achieving the expected impact.
- If a change initiative results in an improvement.
- If the change initiative has been sustained.

Outcome measures describe impacts on patients/babies/parent(s)/families, such as mortality rate, length of stay, hospital acquired infection, adverse incidents, re-admissions, growth pattern of direct breastfeeding baby, satisfaction survey/interview.

Process measures identify how systems and process's function, such as standards of care, performance of procedures, documentation, support to mothers who direct breastfeed their babies.

Structure measures describe physical, organizational, infrastructure characteristics, such as staff to patient ratios, level of neonatal care, physical schematic, environmental features.

Balancing/Influencing measures recognize influencing consequences, positive or negative, such as a physical complication that interrupts direct breastfeeding, emergency re-admission despite regular follow-up visits for direct breastfeeding support at home. ²⁸

Tools of the Continuous Quality Improvement Process: Assessing Where and How to Begin Using Exemplars for FEND Standards Systems Implementation

The following discussion will include “Exemplars” that provided “real life” systems thinking as examples of what some intensive care units are doing to implement change in FEND practices.

Beginning with a Gap Analysis – Determining if there a difference between what is and how it can be better. Asking if feeding, eating and nutritional delivery with babies satisfy the standards of IFCDC is an appropriate question to ask.

- Outline of a Gap Analysis Template – See Appendix A.

Exemplar from the NICU, Children’s Hospital Colorado, Aurora, CO provided by Debra Paul, OTR/L – snapshot of initial analysis of the IFCDC standards and competencies of feeding, eating, and nutrition delivery in the NICU is as follows:

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy would it be to implement this change?	Impact Low=1 Medium=3 High=5	Effort Low=1 Medium=3 High=5	Rank/ Prioritize
<p>Standard 1, Feeding: Feeding experiences in the intensive care unit (ICU) shall be behavior-based and baby-led. Baby-led principles are similar whether applied to enteral, breast, or bottle feeding experience.</p>	<p>Competency 1.1: All staff shall be educated on the physiologic parameters and baby behaviors that are indicative of readiness, engagement, and disengagement. (i.e., the need to alter or stop a feeding)</p> <p>Competency 1.2: All professional staff who feed babies or support m/others to feed their baby shall be trained in appropriate feeding skills, with verified competency in feeding.</p>	<p>Currently didactic lectures are provided to new hires/new grads on variety of topics including developmentally supportive care, positioning and handling, feeding, etc. Best practice would be to provide lectures to not only New Grads but to Floats in the NICU and Travelers.</p> <p>Feeding and Swallowing Team utilize Early Feeding Skills Assessment (EFS) Scale at time of initial consult and thereafter to determine appropriate feeding plan. Currently no standardized way for nursing to document feeding readiness in Doc Flowsheet other than if feeding was attempted and volume consumed. Discussion amongst Feeding and Swallowing Team regarding benefits of incorporating feeding readiness section into Epic for nurses to document whether infant is showing readiness to eat.</p> <p>Feeding and Swallowing Team (OT and SLPs) oriented to baby led feeding philosophy. Currently IFCDC Standards, Competencies and Best Practices incorporated into OT Infant Orientation. Need to confirm speech orientation when staff are on-boarded. No verified competency check off for nursing staff.</p>	<p>Lecture for Float nurses developed few years ago. Ready to go with minor modifications.</p> <p>EFS tool has been incorporated into EPIC.</p> <p>Example ready of how IFCDC can be incorporated into speech orientation and/or nursing orientation.</p>	<p>Example of scoring for Competency # 1.1: 5</p>	<p>Example of scoring for Competency # 1.1: 3</p>	

Utilize Evidence Based Measures and Metrics – What does the data tell us?

- Outline of examples of measures to describe feeding, eating, and nutritional delivery

Measures	Examples
Physiologic	<ul style="list-style-type: none"> • Apnea, bradycardia, desaturations during feeding • # of times baby demonstrates choking, gagging & coughing during feeding
Behavioral	<ul style="list-style-type: none"> • # of feeding opportunities given baby’s engagement behavior • # of times feeds stopped given baby’s disengagement behavior

Competence	<ul style="list-style-type: none"> • Verify stability during routine care • Assess readiness to feed during quiet state • Assess non-nutritive sucking • Offer breast or bottle • Assess stability with initial suck • Assess & respond to stress or disengagement behavior
Satisfaction	<ul style="list-style-type: none"> • Survey to assess staff satisfaction • Survey to assess parent satisfaction
Cultural	<ul style="list-style-type: none"> • Survey to assess perception of unit culture
Outcome	<ul style="list-style-type: none"> • Report/illustration of physiologic, behavioral, competence, satisfaction, culture measures before & after change/rapid cycle

Exemplar – sometimes you have to evaluate/measure post-discharge activity to fully understand the evidence-based change that needs to be made to caregiving while the baby is in the ICU. The aim of caregiving is to provide best feeding management from birth through transition to home, and to sustain the baby’s neurophysiological development long-term, and the baby and parents’ comfort, competence, safety, and joy while feeding/eating. A review of evidence shows that 42% of babies discharged from NICUs have problems feeding/eating.

A study by Horner, et al., identified adverse feeding behaviors exhibited by babies 3-5 months post-discharge as reported by parent feeders.

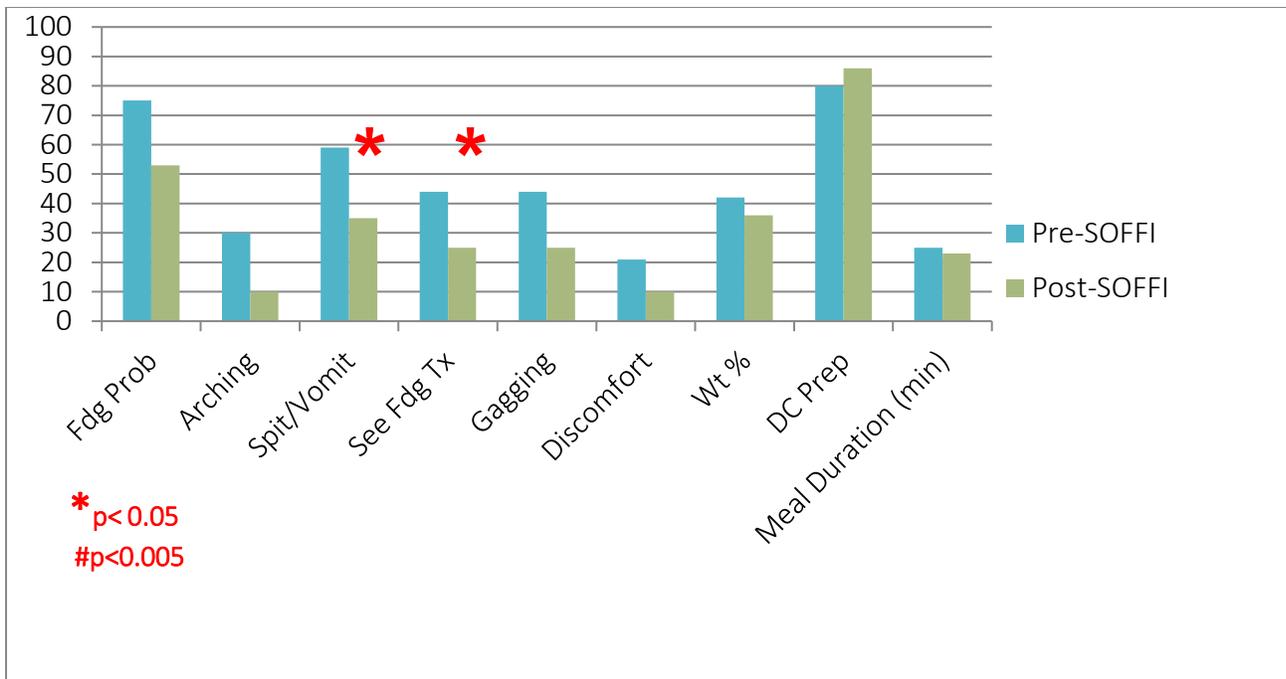
Parent reports of feeding problems at home	Parent responses	Pre-SOFFI	Post-SOFFI	P ^a
Feeding problems	No	14 (25)	34 (47.2)	.01
	Yes	42 (75)	38 (52.8)	
Arching with meals	No	39 (69.6)	65 (90.3)	.003
	Yes	17 (30.4)	7 (9.7)	
Spitting/vomiting	No	23 (41.1)	47 (65.3)	.006
	Yes	33 (58.9)	25 (34.7)	
Seeing feeding therapists	No	31 (56.4)	53 (74.7)	.03
	Yes	24 (43.6)	18 (25.3)	
Gagging with meals	No	44 (78.6)	65 (90.3)	.06
	Yes	12 (21.4)	7 (9.7)	
Discomfort with meals	No	44 (78.6)	65 (90.3)	.06
	Yes	12 (21.4)	7 (9.7)	
Choking with meals	No	46 (82.1)	63 (87.5)	.39
	Yes	10 (17.9)	9 (12.5)	
Sucking problems	No	46 (82.1)	66 (91.7)	.11
	Yes	10 (17.9)	6 (8.3)	
Coughing with meals	No	39 (69.6)	57 (79.2)	.22
	Yes	17 (30.4)	15 (20.8)	
Gulping with meals	No	50 (89.3)	66 (91.7)	.65
	Yes	6 (10.7)	6 (8.3)	
NICU staff prepared parent to feed baby at home	No	11 (19.6)	9 (13)	.32
	Yes	45 (80.4)	60 (87)	
Parent concerned about growth	No	42 (76.4)	55 (76.4)	.99
	Yes	13 (23.6)	17 (23.6)	
Baby readmitted to hospital	No	33 (58.9)	47 (65.3)	.46
	Yes	23 (41.1)	25 (34.7)	

Abbreviations: NICU, neonatal intensive care unit; SOFFI, Supporting Oral Feeding in Fragile Infants.

^aAll results are displayed as number (percentage).

^bBold values indicate $P \leq .05$.

Horner S, Simonelli AM, ... & Ross ES. Setting the stage for successful oral feeding: The impact of implementing the SOFFI feeding program with fragile NICU infants. *Journal of Perinatal Neonatal Nursing*. 2014; 28(1):59-68. doi:10.1097/JPN.000000000000003²⁹



Horner S, Simonelli AM, ... & Ross ES. Setting the stage for successful oral feeding: The impact of implementing the SOFFI feeding program with medically fragile NICU infants. *Journal of Perinatal Neonatal Nursing*. 2014;20(1):59-68. doi:10.1097/JPN.0000000000000003²⁹

Horner S, Hancko M, Simonelli A, Cichowski K, & Schmidt H. The impact of implementing the supporting oral feeding in fragile infants feeding program on oral feeding and growth outcomes of medically complex infants post-discharge. A presentation at The Physical and Developmental Environment of the High Risk Newborn St. Petersburg, FL, January 25-28, 2012.³⁰

Horner S, Ross E, Hancko M, et al. The impact of the SOFFI on feeding outcomes of medically fragile NICU Infants. A presentation at Ann & Robert Lurie Children's Hospital of Chicago. 2012.³¹

Demonstrate progress through metrics and measurement.

There are many ways to present data. The team will want to select the method that makes the most sense for the project, the organization and unit. Additional tools to display, monitor, and analyze measures and metrics are as follows:

- **Control chart** - Graph used to study how a process changes over time. Comparing current data to historical control limits leads to conclusions about whether the process variation is consistent (in control) or is unpredictable (out of control, affected by special causes of variation).
- **Histogram** - The most used graph for showing frequency distributions, or how often each different value in a set of data occurs.
- **Pareto chart** - A bar graph that shows which factors are more significant.

- **Scatter diagram** - Graphs pairs of numerical data, one variable on each axis, to look for a relationship.
- **Stratification** - A technique that separates data gathered from a variety of sources so that patterns can be seen (some lists replace stratification with **flowchart or run chart**).³²

Forum Workgroups as Systems Thinking Exemplars Using Two Example Models

Workgroups at the First Fragile Infant Forum for Integration of Standards (FIFI-S) July 13-15, 2022³⁵ used the Logic and Fishbone Models approach for implementation of IFCDC Standards, Competencies and Best Practices in Intensive Care Management of FEND of the newborn found at the website: <https://nicudesign.nd.edu/nicu-care-standards/> . They are as follows:

Utilizing the Logic Model

Mills, et al., describes a Logic Model as a graphic illustration of how a program or intervention is expected to produce desired outcomes and asks, “how can the problem/situation be assessed in its component parts”? It is the project plan; it shows the relationship between inputs/resources available to develop and initiate an intervention.³³ Petersen, et al., states that the Logic Model is beneficial to better understand situations in complex and dynamic systems to highlight systems interactions/change, clarify aims and gaps, guide the development of measures, and track progress of the intervention and changing needs. Because it provides a “big picture” overview, it must be combined with other tools to detail the steps and stages of the intervention and encourage creative thinking in change initiatives.³⁴

- Outline – See Logic Model Template in Appendix B.

Situation states the identified problem. What do you need/want to change or correct?

Inputs include the resources of the system/organization that influence the problem/situation as well as the change.

Activities outline activities/interventions that can change the problem/situation and the people/programs/agencies who need to be involved.

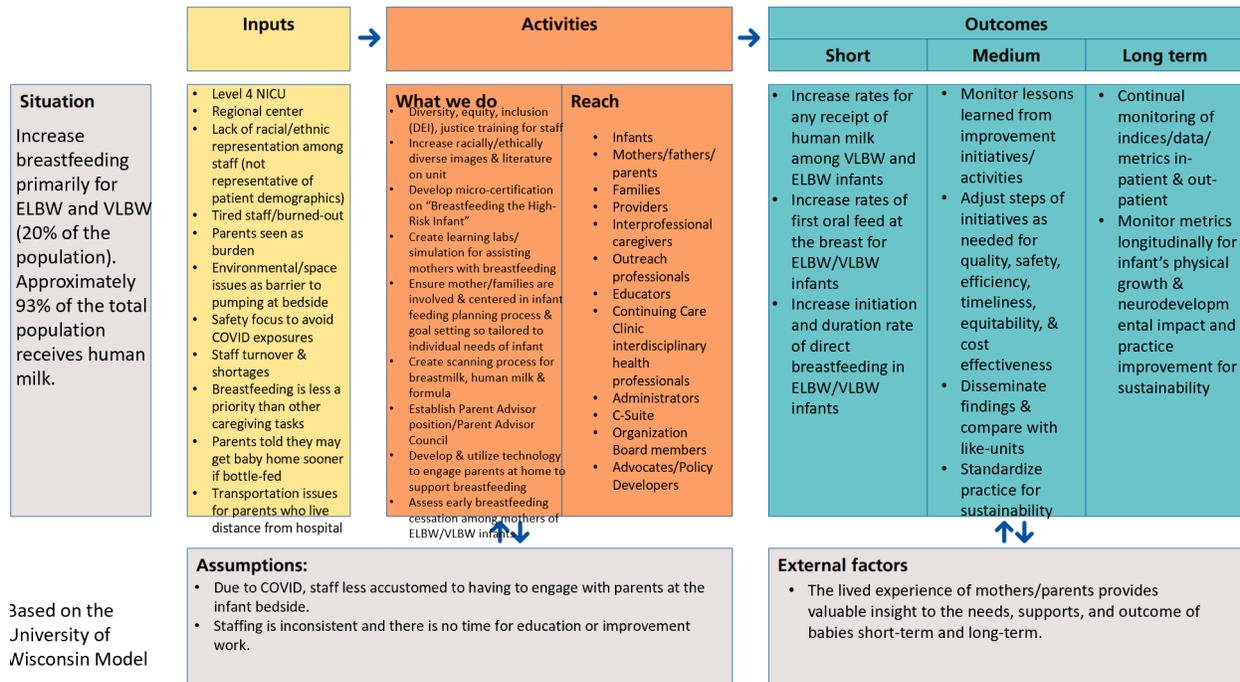
Outcomes describe the expectations (short-, intermediate-, and long-term) that you would like to see.

Assumptions describe perceptions (positive or negative) about the situation that may not be based on data, evidence, or verification.

External factors are circumstances that may influence the outcomes.

Forum Work Groups as Exemplars using the Logic Model

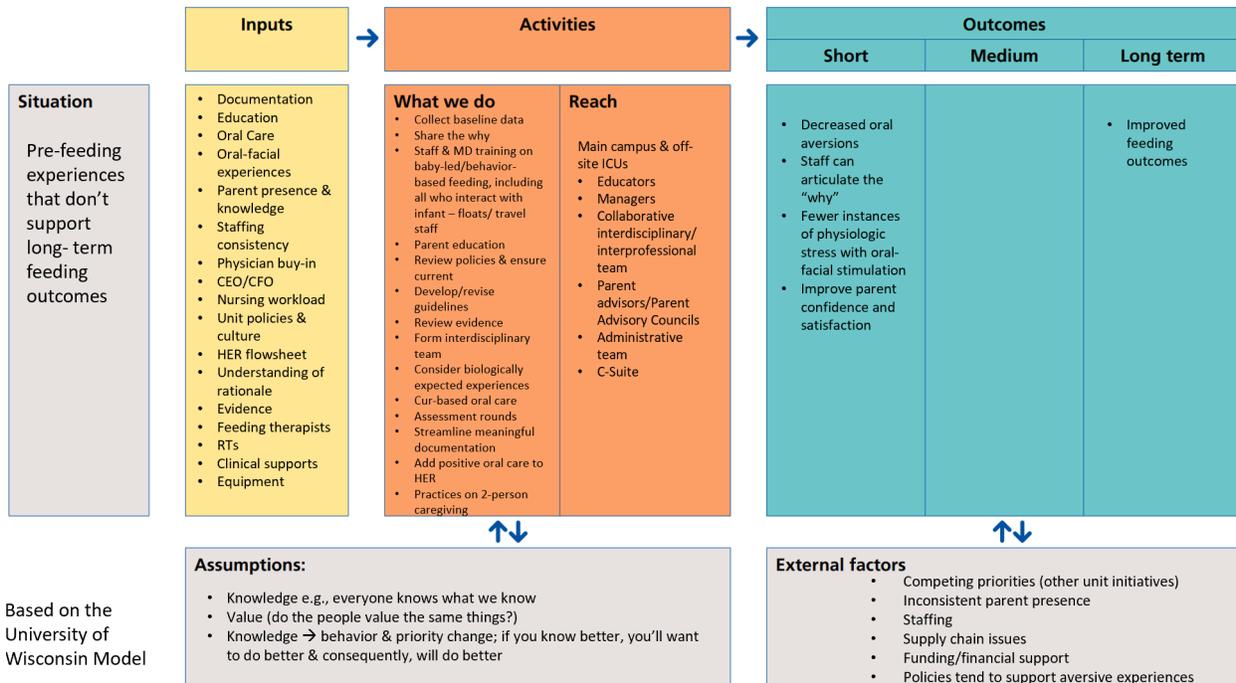
Workgroup 1 – Standard 2: Every mother shall be encouraged and supported to breastfeed and/or provide human milk for her baby.



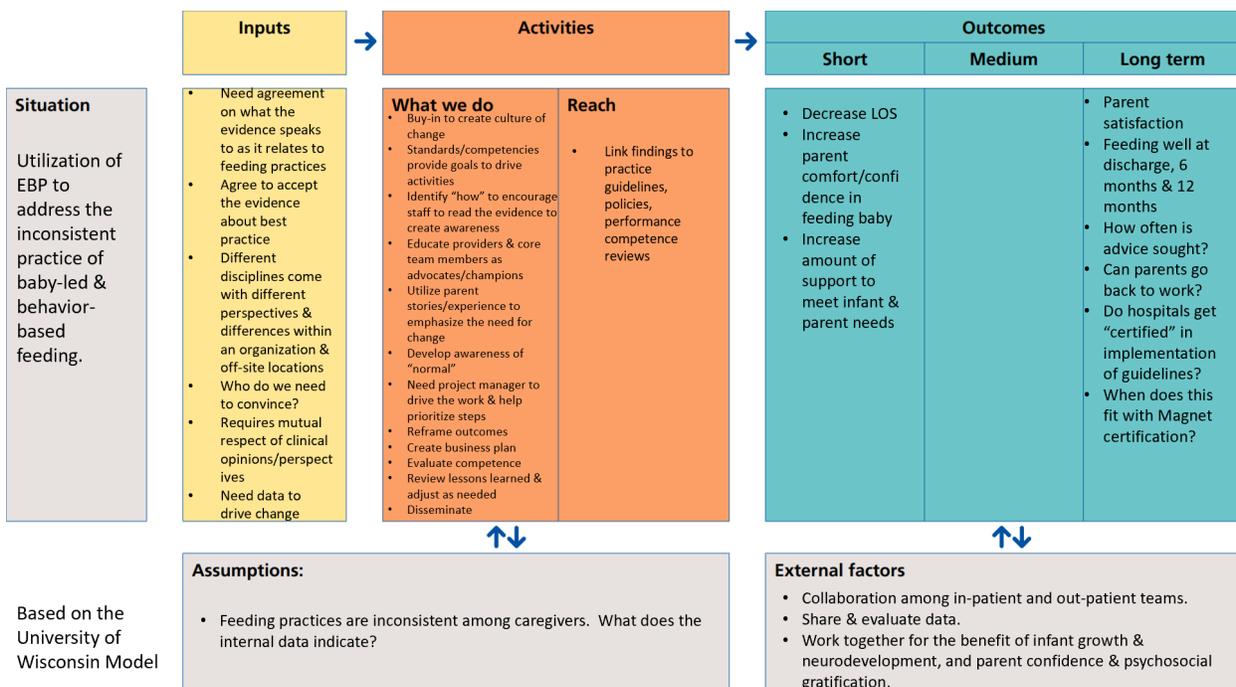
Workgroup 2 – Standard 5: Caregiving activities shall consider baby's response to input, especially around face/mouth, and aversive non-critical care oral experiences shall be minimized.

Standard 6: Professional staff shall consider smell and taste experiences that are biologically expected.

Standard 7: Support of baby's self-regulation shall be encouraged, especially as it relates to sucking for comfort.

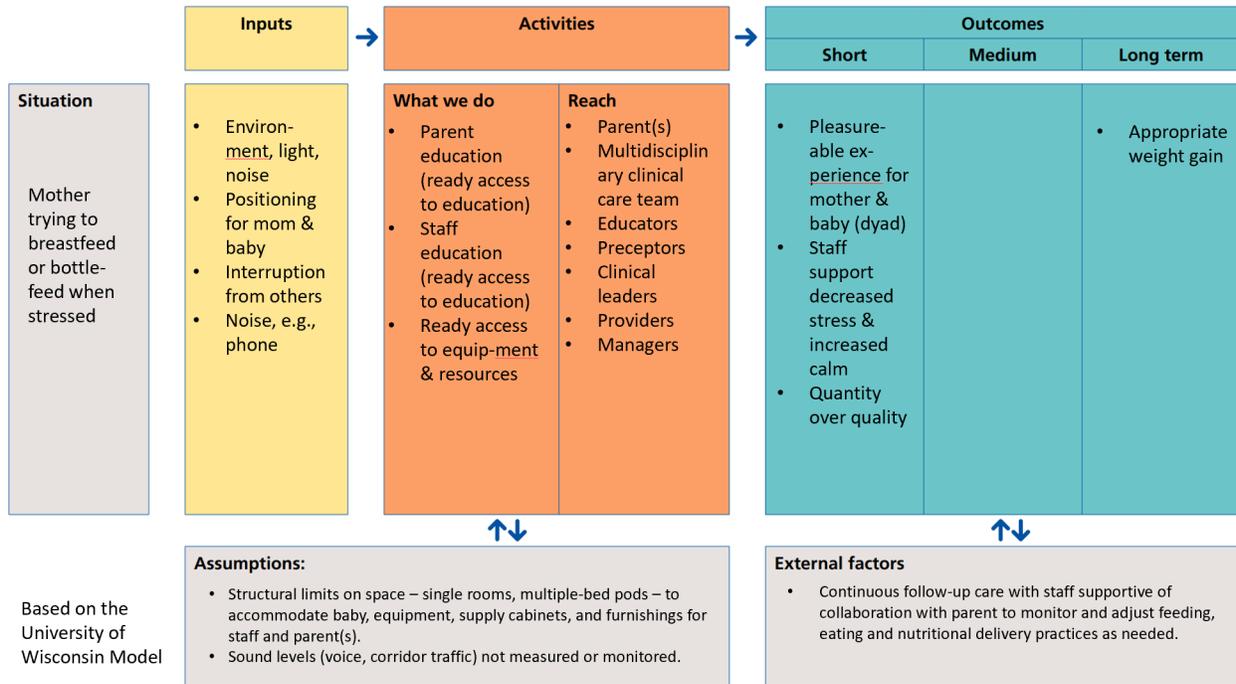


Workgroup 3 – Standard 1: Feeding experiences in the intensive care unit (ICU) shall be behavior-based and baby-led. Baby-led principles are similar whether applied to enteral, breast-, or bottle-feeding experience.



Workgroup 4 – Standard 8: Environments shall be supportive of an attuned feeding for both the feeder and the baby.

Standard 11: Feeding management shall consider short- and long-term growth and feeding outcomes.



Utilizing the Fishbone Model

The **Fishbone Diagram** is used to determine what the relationship is between the cause and effect of the problem/situation and can be used to determine possible causes and causal relationships of a problem or when a team’s thinking tends to fall into ruts.^{32,36} The diagram can be used when challenges, obstacles, or barriers hamper the progress of a change initiative. As a team:

- 1) agree on a statement to describe the problem,
- 2) identify the major categories of the causes of the problem by asking “Why does this happen?”, such as people/infrastructure, environment, supplies/materials, measures/indicators, equipment, methods,
- 3) suggest the possible sub-causes of the problem stemming within each major category by continuing to ask, “Why does this happen?”, and
- 4) continue to break-down the causes and sub-causes until the team has exhausted their ideas of causes and sub-causes of the problem.

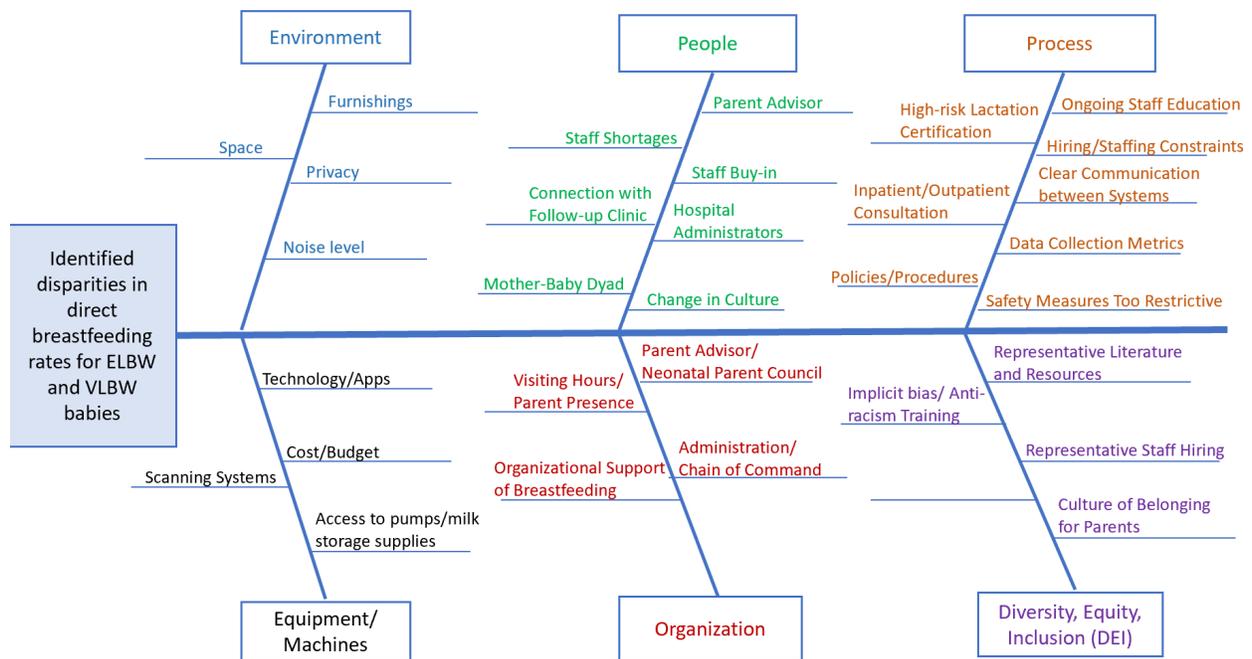
What do the relationships of cause/sub-cause and effect tell you? Do patterns emerge? What change can be planned, trialed, and implemented to make a difference for caregiving with babies and parents?

The visual/illustration can help the team focus

- Outline/template – See Appendix C.

Forum Work Groups as Exemplars using the Fishbone Model

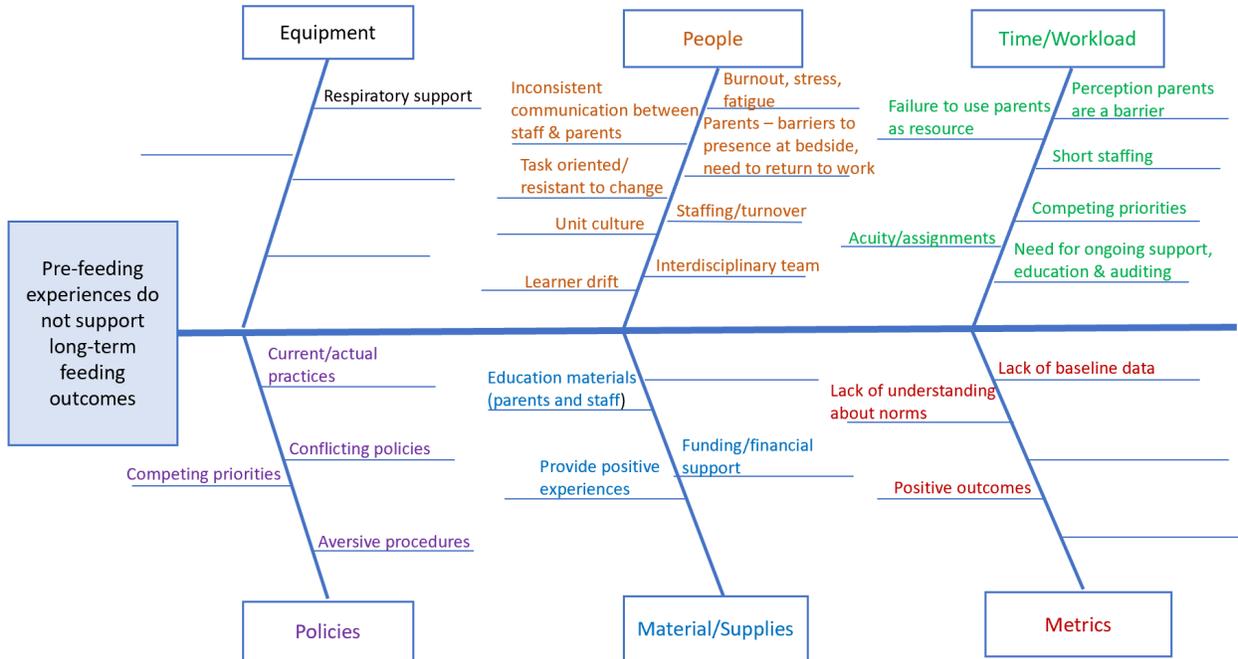
Workgroup 1 - Standard 2: Every mother shall be encouraged and supported to breastfeed and/or provide human milk for her baby.



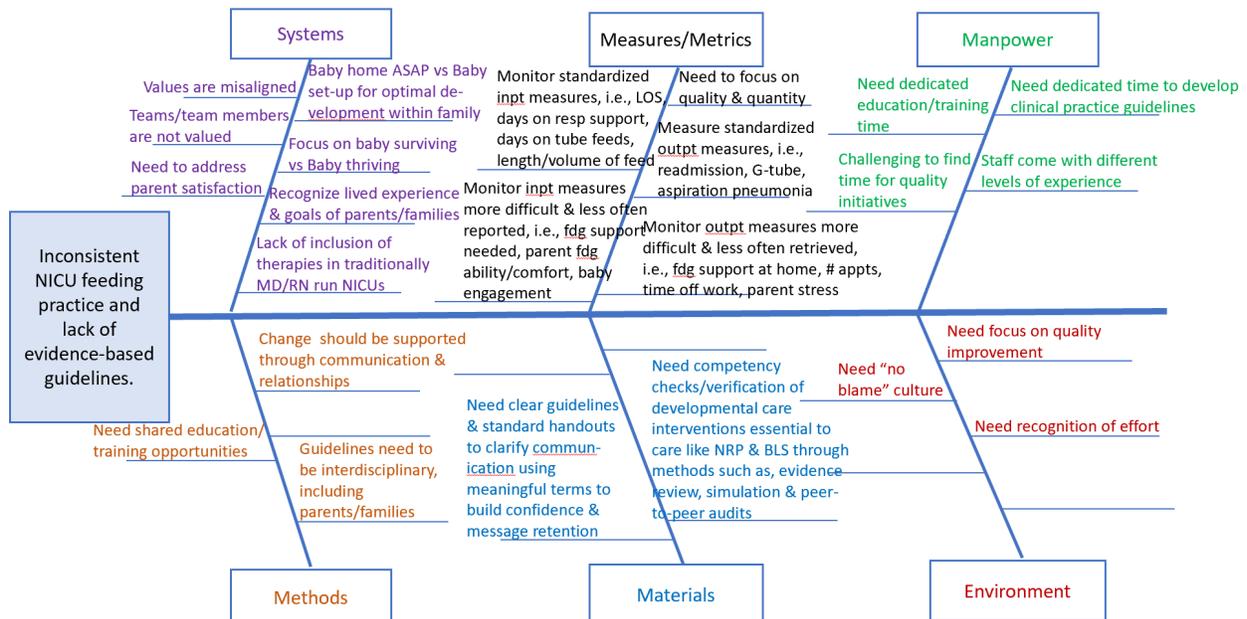
Workgroup 2 – Standards 5: Caregiving activities shall consider baby’s response to input, especially around face/mouth, and aversive non-critical care oral experiences shall be minimized.

Standard 6: Professional staff shall consider smell and taste experiences that are biologically expected.

Standard 7: Support of baby’s self-regulation shall be encouraged, especially as it relates to sucking for comfort.

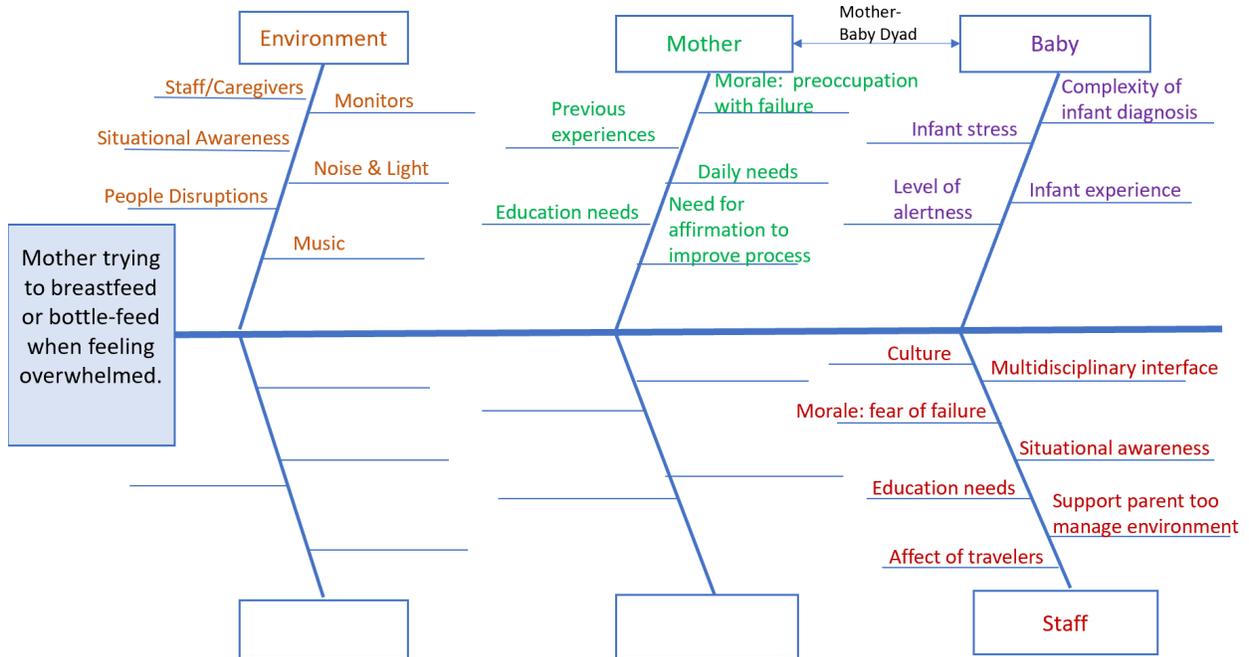


Workgroup 3 – Standard 1: Feeding experiences in the intensive care unit (ICU) shall be behavior-based and baby-led. Baby-led principles are similar whether applied to enteral, breast-, or bottle-feeding experience.



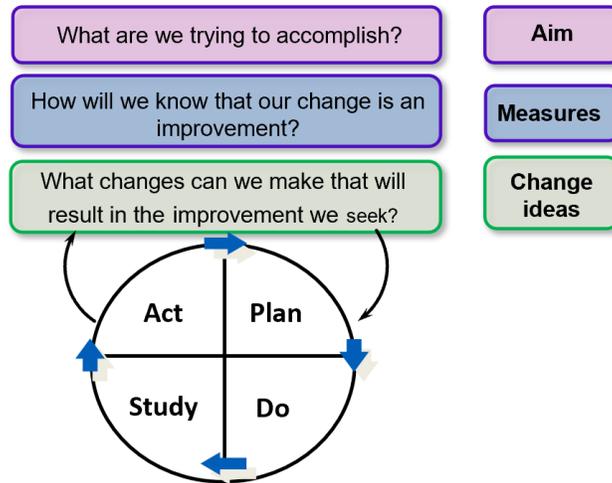
Workgroup 4 – Standard 8: Environments shall be supportive of an attuned feeding for both the feeder and the baby.

Standard 11: Feeding management shall consider short- and long-term growth and feeding outcomes.



Planning How to Begin for FEND Standards Systems Implementation Using the PDSA and Key Driver Approaches

Plan-Do-Study-Act (PDSA) Rapid Cycle of Improvement – How to change an idea into action. Defining what is the cycle(s)/initiative(s) of the change that you want to implement.



The Model of Improvement - Langley GL, Moen R, Nolen TW, Norman CL, Provost LP. The improvement guide: A practical approach to enhancing organizational performance. 2nd edition. San Francisco, CA: Jossey-Bass Publishers; 2009. ¹⁹

- Describe the aim/objective as a SMART statement to capture the specific objective of what you want to change. The aim/objective should be **Specific and narrow, Measurable, Attainable, Relevant, and Time-based.** ³⁷
- Another option is to draft a PICOT, or PIOT, clinical question to define an evidence-based practice continuous quality improvement. The question should identify the **Population, Intervention, Comparison intervention/group if a comparison is appropriate, Outcome and Time.** ²⁰
- Compare the change initiative with the evidence/simulation trial - Test ideas before implementing changes and adjust as necessary.
- It may take more than one cycle to implement an improvement.

- Outline/template – See Appendix D.
- Exemplar using the P-D-S-A were developed by the combined workgroups at the First Fragile Infant Forum for Integration of Standards (FIFI-S) July 13-15, 2022 ³⁵ to

implement Infant and Family Centered Developmental Care (IFCDC) Standards, Competencies and Best Practices in Intensive Care, Section of Management of Feeding, Eating, and Nutritional Delivery of the newborn found at the website: <https://nicudesign.nd.edu/nicu-care-standards/> . The P-D-S-A of an initiative for **Standard 2** stating “**every mother shall be encouraged and supported to breastfeed and/or provide human milk for her baby**”, is as follows:

AIM/PROBLEM - What are we trying to accomplish?
<ul style="list-style-type: none"> Increase direct breastfeeding rates for ELBW and VLBW babies

MEASURES - How will we know that our change is an improvement?
<ul style="list-style-type: none"> Identify baseline rates of direct breastfeeding for ELBW and VLBW babies (initiate, maintain, discharge, first follow-up visit) Identify demographics to address disparity concerns Measure parent satisfaction

CHANGE IDEAS - What changes can we make that will result in the improvement we seek?
<ul style="list-style-type: none"> Interview moms about their experiences Collect early colostrum right after birth – hand expression Classes prior to birth that review the benefits of breastfeeding, golden hour, milk collection and storage Continuity of lactation support Ensure all moms have access to hospital grade pump Increase rates of nuzzling at the breast prior to infant engaging in direct breastfeeding Home-going plan and consult before discharge Review of existing evidence Address identified social determinants of health as needed (food insecurity, homelessness, etc)

Types of Measures	
Qualitative	Quantitative
Demographics	Rate ELBW babies direct breastfeed
Interviews	Rate VLBW babies direct breastfeed
Satisfaction	Stats of parent identified factors/concerns

Key Driver Diagram

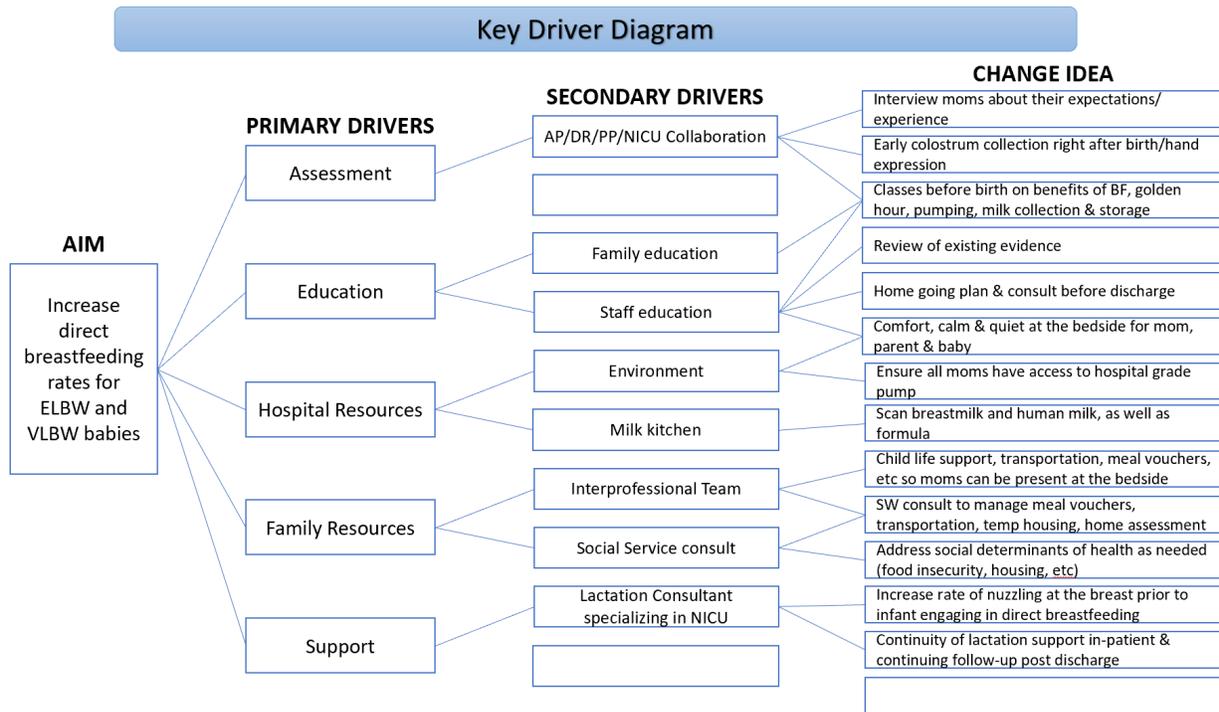
The Key Driver Diagram helps the team visualize what drives the achievement of the aim/objective – steps, sequence, new knowledge, skills - needed to make a difference/change as well as to know if the endpoint has been reached. The picture of a team’s shared view is helpful to communicate the aim and process to a range of stakeholders in the setting where a team is testing and working.³⁸

A driver diagram shows the relationship between the overall aim of the project, the primary drivers/key drivers that contribute to achieving the aim, the secondary drivers that are parts of the primary drivers and change ideas to test for each secondary driver. (Institute of Healthcare Improvement)

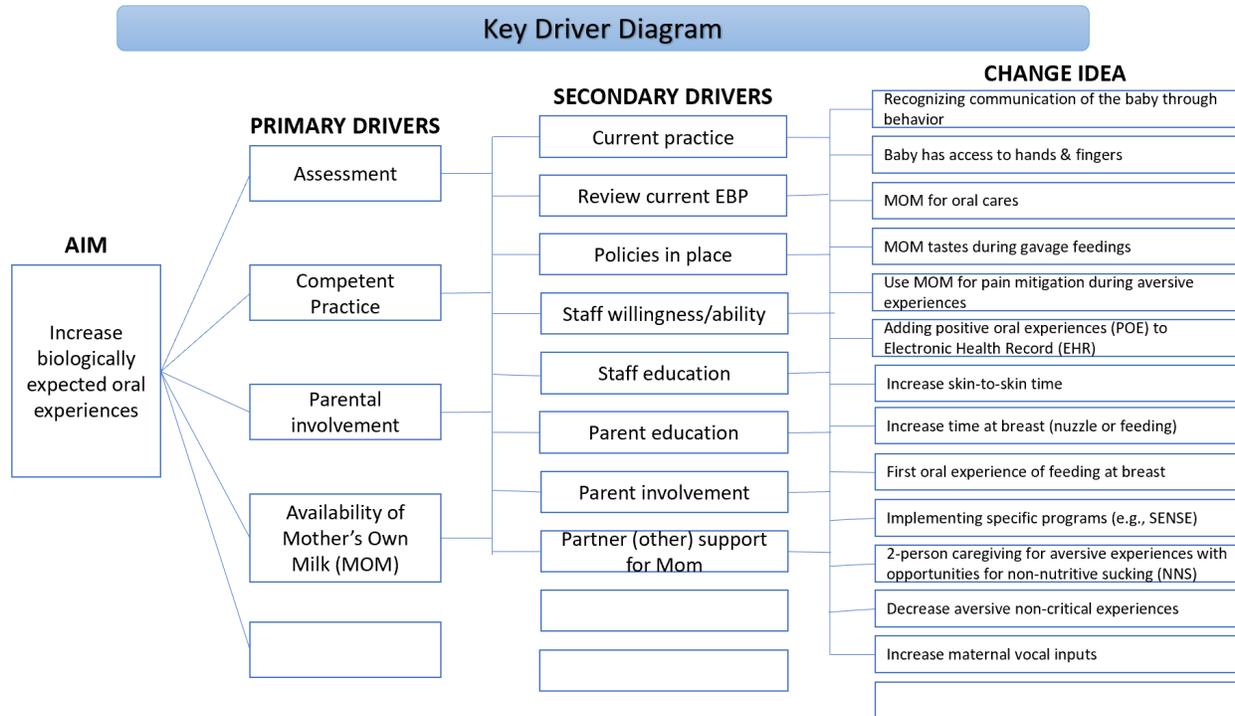
- Outline/template – See Appendix E.

An Exemplar using the Key Driver Diagram was developed by the combined workgroups at the First Fragile Infant Forum for Integration of Standards (FIFI-S) July 13-15, 2022³⁵ to implement

Infant and Family Centered Developmental Care (IFCDC) Standards, Competencies and Best Practices in Intensive Care, Section of Management of Feeding, Eating, and Nutritional Delivery of the newborn found at the website: <https://nicudesign.nd.edu/nicu-care-standards/> . The Key Driver Diagram of an initiative for **Standard 2** stating “**every mother shall be encouraged and supported to breastfeed and/or provide human milk for her baby**”, is as follows:



- The Key Driver Diagram of an initiative for **Standards 5, 6, & 7** stating:
 - (5) “**Caregiving activities shall consider baby’s response to input, especially around face/mouth, and aversive non-critical care oral experiences shall be minimized**”,
 - (6) “**Professional staff shall consider smell and taste experiences that are biologically expected**”, and
 - (7) “**Support of baby’s self-regulation shall be encouraged, especially as it relates to sucking for comfort**” is as follows:



Implementation of the FEND Standards Systems Implementation Plan: Execution, Monitoring and Maintenance

Executing the Implementation – The roll-out of each change idea/initiative can be managed using the continuous improvement process tools. It helps to assure that caregivers stay motivated.

The execution of the practice initiative should be preceded by the evidence-based education of the initiative, performance competency validation, a trial(s) of the initiative, and modifications as needed. Set a start date and ignite the passion and energy of the team members, caregivers, and parents.

Through the implementation, ensure caregivers and parents monitor the process, communicate openly, and share innovations with the team to maintain consistency of practice. The champions of the initiative serve as guides, mentors, and motivators. Team leaders monitor the performance, progress, challenges, innovations, safety factors, and measures/metrics. Team leaders encourage collaboration among the interprofessional team and parents to ensure shared planning, continuing education from lessons being learned, and decision-making. Utilize the lived experience of the parent(s)/families by using the native language to ensure the meaning of the message and infuse cultural norms and traditions in caregiving. Parent advisors can provide valuable observations and recommendations. Recognize caregivers/team members for their engagement, contribution, and persistence. Celebrate the steps of progress, even the small ones. Be positively persistent to navigate the path forward and work through

any challenges that are encountered. It is important to communicate progress and data with intra- and inter-department and executive partners. In addition, communicate with support systems, such as follow-up services and community agencies, that may benefit short- or long-term from the improvement initiative. This may serve to link the practice with continuing healthcare services.

Monitoring the Implementation – Continuous monitoring is critical to know if the change has been implemented to achieve the desired outcome.

Monitoring the process of the change initiative, interprofessional performance competency, measures/metrics and the flow and progress of the initiative, caregiver and parent satisfaction, and dissemination of the progress and data. The feedback, positive and/or negative, helps the team to gain the perspective of those not intimately engaged in the change process, and addressing the points are important to engage other caregivers as the initiative is spread to the larger staff infrastructure.

Maintenance – The change needs to be maintained. When the change initiative is complete, the measures/metrics are documented, and the outcome evaluated, consider the spread of the initiative to the larger population of babies, like-ICUs, out-patient services, community outreach services. Identify the positives/strengths of the change, the limitations, safety concerns, obstacles and innovations, interpretation of the data, short- and long-term implications to the population of babies and their parent(s)/families.

Engage the interprofessional team and parents to plan the method(s) and process to maintain the change initiative through the spread. A gradual roll-out may be wise to keep caregivers motivated, the education and performance competency validation fresh, and the monitoring of the process and data effective. Patience and moderation lead to satisfaction and success.

Evaluating FEND Standards Systems Implementation: Lessons learned, Storybook Approaches, Dissemination through Publication and Sustaining the Momentum

Lessons Learned – There are always lessons learned from an experience. Asking what has been learned through the change process(s) and monitoring the data is a helpful approach. Take the time to listen to the lessons learned from the team, caregivers, parents, management, department, and executive partners. Gather them, categorize them, and evaluate to assess the implication of the message(s). The process can be insightful and valuable to the improvement process.

Playbook/Storybook – Develop a playbook/storybook that records the products and process of the CQI improvement, and subsequent improvements over time. ³⁶ (Scholtes) It provides a method to demonstrate the steps, assessment, gaps and plans, improvement cycle initiatives, data and data interpretation, lessons learned, and model/rationale of unit CQI for the organization, and as an exemplar of CQI for certification organizations. Further, it can serve as a guide to mentor unit leaders. A playbook may contain the following:

- Interprofessional Collaborative Team
- Evidence
- Gap Analysis/Problem identification
- Gap/Problem cause & effect - Fishbone diagram
- Planning the Cycles/Stages of Change - Key driver diagram
- Assessment/measuring tools
- Measures/Metrics – graphs to display change/improvement over time
 - Definition of the measures/metrics
 - Before the improvement/after the improvement
 - Continuous monitoring
- Communication with team throughout the process & identify lessons learned
- Dissemination of process and results
 - Policies
 - Procedures
 - Clinical guidelines
 - Interprofessional Education – orientation, continuing education, annual updates, mentorship, simulation
 - Interprofessional performance competence validation and annual review
 - Poster
 - Presentation
 - Evidence Based Practice (EBP)/Continuing improvement collaborative

Dissemination and Publication –It is important to disseminate the process and findings of the CQI initiative in order to share the experience and data with comparable systems. There will always be improvements that can be made to the practice. Sharing, or spreading, the experience from in-patient to out-patient services or to other ICUs, enhances quality practice and performance for the population. Further, publication adds to the evidence-base for all. Consider the following ways to disseminate and publish:

- Visual displays of the tools, data, and process of the improvement initiative(s) within the ICU
- Healthcare Organization Continuous Quality Improvement (CQI) Committee(s)
- EBP/Continuing Improvement Collaboratives – state, national, global
- Third party payor(s)
- Poster
- Conference abstract-presentation
- Journal article

Sustainment – Sustain the practice long term by continuously monitoring the education, competency, collaboration, and outcome(s). Sustaining improvement and continuing to improve over time as the science evolves can be a challenge, though it is paramount. Monitoring the data through the hospitalization and continuing care shows the pattern of the outcome and indicates where further improvement is needed.

Summary

This First FIFI-S Forum was an opportunity for like-minded neonatal interprofessionals to collaborate using the evidence of the Feeding, Eating, and Nutritional Delivery Standards of the IFCDC Standards, Competencies and Best Practices in Intensive Care to develop initiatives for implementation. The White Paper is a guide using examples prepared by the faculty and participants.

FIFI-S Faculty and Contributors to this White Paper:

- **Faculty**

Joan Arvedson
Joy Browne
Sharon Cox
Pamela Dodrill
Carol Jaeger
Carole Kenner
Kelly McGlothen-Bell
Jacqueline McGrath
Britt Pados
Debra Paul
Erin Ross

- **Contributors/Participants**

Anne Albi
Melissa Andersen
Jacquelin Ashbaugh
Sandi Aubuchon
Diane Ballweg
Daphna Barbeau
Tara Bastek
Nicole Bazinet
Shari Brinson
Grace Dwyer
Johanna Fellman

Kirsten Halstead
Jaylee Hilliard
Jennifer Hofherr
Susan Horner
Tammi Jantzen
Katherine Kays
Kristin Key
Lisa Kleinz
Lauree Kruyer
Erin LaSage
Mary Alice Melwak
Isabelle Milette
Ravi Mishra
Lisa Nagle
Kathleen Ott
Roberta Pineda
Lara Roehrig
Susan Rojas
Rena Rosenthal
Zoe Rosler
Elba Simon-Fayard
Jamie Strott
Teresa Tyndall
Dawn VanNatta
Karen Varga
Peggy Werner
Adilla Zakiati

Acknowledgements

The Planning Committee wishes to acknowledge Prolacta Bioscience, Inc. for an education grant that partially supported this forum, in addition to the continuing funding assistance of the University of South Florida College of Public Health, Loma Linda Publishing Company, and PACLAC. We extend a special thank you to Mitch Goldstein, MD, and the PACLAC staff for their guidance, hands-on support, and positive attitude.

Conflict of Interest Statement

The Planning Committee and faculty do not have financial, or non-financial, relationships with industry that are relevant to this topic.

References

1. Consensus Committee on Infant Family Centered Developmental Care. Report of the first consensus conference on standards, competencies and best practices for infant and family centered care in the intensive care unit. <https://nicudesign.nd.edu/nicu-care-standards/>; February 2020.
2. Browne J, Jaeger C, Kenner C, and the Consensus Committee on Infant Family Centered Developmental Care. Executive Summary: Standards, Competencies and Best Practices for Infant and Family Centered Care in the Intensive Care Unit. *Journal of Perinatology*, 2020. doi: 10.1038/s41372-020-0767-1
3. Browne JV. Gravens by Design: Standards, competencies, and best practices for infant and family developmental care in intensive care: The time has come. *Neonatology Today*, 2021; 26-7. www.NeonatologyToday.net/August2021
4. Browne JV & Kolberg KJS. Gravens by Design: Infant and family centered developmental care standards, competencies and best practices – What is the evidence? 2021; 38-39. www.NeonatologyToday.net/December2021
5. Browne JV. Fragile Infant Forums for Implementation of IFCDC Standards (FIFI-S) Column: The First FIFI-S Forum on Implementing Feeding, Eating, and Nutrition Delivery. *Neonatology Today*, 2022; 62-64. www.NeonatologyToday.net/August2022
6. Douglas PS, Hill PS, Brodribb W. The unsettled baby: How complexity science helps. *Archives of Disease in Childhood*. 2011; 96(9): 793-797. <https://doi.org/10.1136/adc.2010.199190>
7. Plsek P, Greenhalgh T. The challenge of complexity in healthcare. *Complexity Science BMJ*. 2001; 323:625-628.
8. Wilson T, Holt T, Greenhalgh T. Complexity and clinical care. *Complexity Science BMJ*. 2001; 323:685-688.
9. Plsek PE, Wilson T. Complexity, leadership, and management in healthcare organizations. *BMJ*. 2001; 323(7315):746-749.
10. Fraser SW, Greenhalgh T. Coping with complexity: educating for capability. *BMJ*. 2001; 323(7316): 799-803.
11. Greenhalgh T, Patoutsi C. Studying complexity in health services research: Desperately seeking an overdue paradigm shift. *BMC Medicine*. 2018; 16(1):95.
12. Kenner C & Jaeger C. Recommendations for best practices in systems thinking. In: Report of the first consensus conference on standards, competencies and best practices for infant and family centered care in the intensive care unit. <https://nicudesign.nd.edu/nicu-care-standards/>; February 2020.
13. Consensus Committee on Infant Family Centered Developmental Care. Gravens Conference Workshop: Recommended Standards, Competencies and Best Practices for Infant and Family Centered Care in the Intensive Care Unit. 2017 & 2020.
14. Ross E, Arvedson J, McGrath J. Recommendations for best practices for feeding, eating and nutrition delivery. In: Report of the first consensus conference on standards,

- competencies, and best practices for infant and family centered care in the intensive care unit. <https://nicudesign.nd.edu/nicu-care-standards/> ; February 2020.
15. Kenner C & McGrath JM (Eds.). NANN's Developmental care of newborns and infants: A guide for health professionals (3rd ed.). Wolters Kluwers, 2022. ISBN-13: 978-1975148393
 16. Gerard DR. Quality improvement using the Donabedian Model. EMS World, 2022. Accessed online at <https://www.hmpgloballearningnetwork.com/site/emsworld/original-contribution/quality-improvement-using-donabedian-model/>
 17. Donabedian A. Evaluating the quality of medical care. The Milbank Quarterly, 2005; 83(4): 691-729.
 18. Alexandrov AW, Brewer TL, Brewer BB. The role of outcomes and evidence-based quality improvement in enhancing and evaluating practice changes. In: Melnyk BM & Fineout-Overholt E. Evidence-based Practice in Nursing and Healthcare: A guide to best practice. 4th edition. Philadelphia, PA: Wolters Kluwer; 2019. p. 293-312.
 19. Langlely GL, Moen R, Nolen TW, Norman CL, Provost LP. The improvement guide: A practical approach to enhancing organizational performance. 2nd edition. San Francisco, CA: Jossey-Bass Publishers; 2009.
 20. Melnyk BM & Fineout-Overholt E. Evidence-based practice in nursing and healthcare: A guide to best practice. 4th edition. Philadelphia, PA: Wolters Kluwer; 2019.
 21. White KR & Griffith JR. The well-managed healthcare organization, 7th edition. Chicago, IL: Health Administration Press; 2010.
 22. Ginter PM, Duncan WJ, Swayne LE. Strategic management of health care organizations, 7th edition. San Francisco, CA: Jossey-Bass; 2013.
 23. Harrison JP. Essentials of strategic planning in healthcare. Chicago, IL: Health Administration Press; 2010.
 24. Rahman T, Moktadir MA, Paul SK. Key performance indicators for a sustainable recovery strategy in health-care supply chains: COVID-19 pandemic perspective. Journal of Asia Business Studies. 2022; 16(3):472-494. <https://doi.org/10.1108/JABS-05-2021-0200>
 25. Duck JD. The change monster. The human forces that fuel or foil corporate transformation and change. New York, NY: Crown Business, 2002.
 26. Kotter JP, What leaders really do. Cambridge, MA: Harvard Business Review, 1999.
 27. Kotter JP & Cohen DS. The heart of change: Real-life stories of how people change their organizations. Boston, MA: Harvard Business School Press, 2012.
 28. National Health Service (NHS). ACT Academy – Online library of quality, service improvement and redesign tools: A model for measuring quality care. London: National Health Service, 2021. <https://www.med.unc.edu/ihqi/wp-content/uploads/sites/463/2021/01/A-Model-for-Measuring-Quality-Care-NHS-Improvements-brief.pdf>

29. Horner S, Simonelli AM, ... Ross ES. Setting the stage for successful oral feeding: The impact of implementing the SOFFI feeding program with fragile NICU infants. *Journal of Perinatal & Neonatal Nursing*. 2014; 28(1):59-68. doi:10.1097/JPN.0000000000000003
30. Horner S, Hancko M, Simonelli A, Cichowski K, Schmidt H. The impact of implementing the Supporting Oral Feeding in Fragile Infants Feeding Program on oral feeding and growth outcomes of medically complex infants post-discharge. A presentation at The Physical and Developmental Environment of the High Risk Newborn St. Petersburg, FL; January 25-28 2012.
31. Horner S, Ross E, Hancko M, et al. The impact of the SOFFI on feeding outcomes of medically fragile NICU Infants. A presentation at Ann & Robert Lurie Children's Hospital of Chicago. 2012.
32. ASQ. <https://asq.org/quality-resources/seven-basic-quality-tools> Accessed in 2022.
33. Mills T, Lawton R, Sheard L. Advancing complexity science in healthcare research: The logic of logic models. *BMC Medical Research Methodology*. 2019; 19(1):55.
34. Petersen D, Taylor EF, Peikes D. Logic Models: The foundation to implement, study, and refine patient-centered medical home models. Rockville, MD: Agency for Healthcare Research and Quality; Feb 2013. AHRQ Publication No. 13-0029-EF. www.ahrq.gov
35. First Fragile Infant Forum for Integration of Standards – Infant and Family Centered Developmental Care Best Practices for Feeding, Eating, and Nutritional Delivery, July 13-15, 2022, Monrovia, CA. Supported by Loma Linda Publishing Company, University of South Florida College of Public Health, and PACLAC.
36. Scholtes PR, Joiner BL, Streibel BJ. The team handbook, 3rd edition. Madison, WI: Oriel Incorporated. 2003.
37. Doran G, Miller A, Cunningham J. There's a S.M.A.R.T. way to write management goals and objectives. *Management Review*. 1981; 70(11).
38. Institute of Healthcare Improvement (IHI). Quality improvement essentials: Tools. Retrieved from <http://www.ihl.org/resources/Pages/Tools/Quality-Improvement-Essentials-Toolkit.aspx>

Appendix A

Gap Analysis Template – First Fragile Infant Forum for Integration of Standards (FIFI S): Infant and Family Centered Developmental Care Section on the Management of Feeding, Eating and Nutrition Delivery.

Gap Analysis prepared by Debra Paul, OTR/L

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
<p>Std 1: Feeding experiences in the ICU shall be behavior-based & baby-led.</p>	<p>1.1: All staff be educated on the physiologic parameters that are indicative of readiness, engagement, & disengagement.</p> <p>1.2: All professional staff who feed babies or support m/others to feed their baby shall be trained in appropriate feeding skills, with verified competency in feeding.</p> <p>1.3: Consistency of feeding practices among staff who feed an infant</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>shall be promoted, monitored, and verified.</p> <p>1.4: Parents and other caregivers (m/others) shall be given information and guidance regarding how to interpret the communication of their baby behaviors that indicate safe and enjoyable feeding experiences (e.g., physiologic parameters as well as behaviors of feeding engagement and disengagement).</p> <p>1.5: Professional caregivers shall support m/others to engage in appropriate responses to their baby's communication during feedings.</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>1.6: All oral experiences should be based upon the baby's behaviors and focused on enjoyable non-stress interactions. Biologically expected experiences (Tactile and feeding) shall be the primary focus rather than exercise/therapy driven interventions that are not part of a healthy fetus or newborn's experience. Non-critical care oral experiences that cause distress or instability (e.g., changes in heart rate (HR), respiratory rate (RR), saturations, color changes, crying, hiccupping, yawning, gasping) should be minimized.</p> <p>1.7: Baby behavior at the beginning (baseline) of feeding as well as changes</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>during feeding for physiologic, motor, behavioral state, and interaction parameters shall guide the feeder's decision to continue or discontinue the feeding. While some of the stability is common, the focus shall be maintaining a minimal level of baseline physiologic stability and behavior throughout the feeding or regaining baseline stability when the baby loses stability during the feeding.</p> <p>1.8: When professionals/ caregivers determine best delivery of enteral feedings, in addition to nutritional considerations, the baby's physiologic and behavioral responses shall be considered.</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>1.9: Baby behavior as well as medical stability shall guide initiation of oral feeding attempts as gestational age does not address normal variability seen in development or with the impact of medical comorbidities.</p> <p>1.10: Oral feeding shall be modified or stopped when the baby no longer shows stability or engagement.</p> <p>1.11: Oral feeding plans shall be individualized based on the baby's behaviors and performance, as well as overall progress.</p> <p>1.12: M/other feeding preferences shall be included and supported whenever possible during the development of</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	feeding management plans.					
Std 2: Every mother shall be encouraged & supported to breastfeed and/or provide human milk for her baby.	<p>2.1: Human milk should be available to all babies in the ICU (maternal or donor).</p> <p>2.2: Professional staff shall provide information to m/others regarding the importance and benefits of human milk, and the influence of human milk on medical, nutritional,</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>and neurobehavioral outcomes.</p> <p>2.3: Maternity and ICU teams shall partner to communicate the importance of and facilitate early hand expression of colostrum and early and frequent mechanical pumping of human milk.</p> <p>2.4: Systems shall actively encourage mothers to provide their human milk. Support for feeding challenges both with initiation of pumping and transition to breast feeding shall be anticipated and provided.</p> <p>2.5: ICU systems shall support mother/baby dyads to transition to breast feeding (where</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>possible), in addition to providing human milk by other means.</p> <p>2.6: ICU systems shall provide lactation support to m/others for the entire hospital stay, from initiation of breast pumping to successful breast feeding.</p> <p>2.7: Breast feeding support for transition home shall be identified and communicated to m/others prior to discharge (where appropriate).</p> <p>2.8: For babies who are both breast and bottle fed, breast feeding should be initiated first whenever possible. Breast feeding should be offered for every feeding that the</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>mother is available, as tolerated by the baby.</p> <p>2.9: Alternatives to bottle feeding shall be used until breast feeding is well established based upon the desire of the family, in consultation with the ICU staff.</p>					
<p>Std 3: Nutrition shall be optimized during the ICU period.</p>	<p>3.1: Growth shall be measured, monitored, and optimized both in the ICU and in the early post-discharge period. High-risk infants may require human milk to be fortified for some period of time to meet their full nutritional needs.</p> <p>3.2: Staff should be trained to accurately collect weight, length, and</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	head circumference parameters.					
Std 4: M/others shall be supported to be the primary feeders of their baby.	<p>4.1: ICU professionals shall actively work with m/others to assist them to feel confident and competent with feeding their babies.</p> <p>4.2: Where relevant/necessary, bottle feeding shall be conducted by the m/other when she/he is present rather than by ICU professionals so that m/other is supported to be the expert. M/others or their designees shall be identified as the primary provider(s) of sustenance and nurturing.</p> <p>4.3: Professionals shall support the parents' understanding of their</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p data-bbox="527 402 821 548">baby's communicative behaviors, while guiding and supporting the feeding experience.</p> <p data-bbox="527 581 852 954">4.4: Emotional support should be available to minimize stress on the family when babies are not eating well, and/or when the family or m/other are having difficulty with their expectations for successful breastfeeding.</p> <p data-bbox="527 987 852 1360">4.5: Extensive support and education shall be offered to m/others who are unable to be the primary feeder during the hospital stay (prior to and after discharge), to ensure confidence and competence in feeding the baby.</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	4.6: M/others shall be provided education in a manner that is individualized to the m/other's learning style and ability to understand and retain the information.					
Std 5: Caregiving activities shall consider baby's response to input, especially around face/mouth, and aversive non-critical care oral experiences shall be minimized.	5.1: Suctioning, respiratory support, and other oral care shall be considered as a potential aversive input to the face and mouth and be performed only as necessary and with conscious attention to minimizing distress.					
Std 6: Professional staff shall consider smell and taste experiences that are biologically expected.	6.1: Odors/tastes of expressed human colostrum and/or milk shall be provided as soon					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>after birth as medically indicated/allowed.</p> <p>6.2: Odors/tastes of human milk shall be provided as a way to increase interactions/familiarity with the baby's m/other.</p> <p>6.3: Skin-to-skin care shall be facilitated early and often. (See skin-to-skin standards).</p>					
<p>Std 7: Support of baby's self-regulation shall be encouraged, especially as it relates to sucking for comfort.</p>	<p>7.1: Non-nutritive sucking (NNS) opportunities shall be offered to all babies in the ICU, for comfort, during gavage feeds, and as support during painful procedures.</p> <p>7.2: Mothers shall be encouraged to be available for the baby's</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	exploration/comfort at breast.					
Std 8: Environments shall be supportive of an attuned feeding for both the feeder and the baby.	8.1: Environments shall be as free of distractions as possible, in order to support both the baby and the feeder to focus on the feeding. Distal environmental influences include ambient noise, lighting, activity around the bed space, availability of a comfortable chair for the feeder, and free from distractions (e.g., phones, conversations). Proximal environmental influences include positioning of the baby in midline with neutral/slight flexion in body/neck as well as postural support for the entire body of the baby.					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>8.2: The use of special positioning (e.g., side-lying, upright) shall be individualized based on the baby's needs, documented, and assessed for change as the baby develops feeding competence.</p> <p>8.3: Special bottle nipples/bottle systems should be adjusted based upon the infant's ability to maintain physiologic stability and develop/use suction properly. Flow rates from bottles should be documented and assessed according to the baby's emerging competence. Bottle/nipple options should be individualized for the baby's abilities, and modified as the baby</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	grows, becomes stronger, and changes.					
Std 9: Feeding management shall focus on establishing safe oral feedings that are comfortable and enjoyable.	<p>9.1: Feeding shall minimize risks for aspiration and/or other adverse cardio-pulmonary consequences.</p> <p>9.2: Modifications to support feeding shall be individualized, documented, verbally shared among professionals and parents to facilitate continuity, and used in the development of a comprehensive feeding plan. Communication shall focus on decreasing variability between feedings and on supporting the baby's skill development.</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>9.3: Babies shall not be forced to suck or finish a prescribed volume orally if they are losing physiologic stability, are no longer actively sucking, or are asleep.</p> <p>9.4: If, despite maximal supports, pleasurable feeding experiences cannot be achieved, babies should be held and be provided smells/tastes and an opportunity to engage in non-nutritive sucking while being given their feeding enterally.</p>					
Std 10: ICUs shall include interprofessional perspectives to provide best feeding management.	10.1: Intensive care policies and time management shall provide opportunities for professional staff and the baby's family to discuss feeding management.					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>10.2: Interprofessional team members shall review the parental involvement in care, and the baby's regulation and stability in the context of feeding and weight/gain/energy conservation, during rounds.</p> <p>10.3: Feeding plans and the progress of the baby's feeding skills should be monitored and documented. Changes to the feeding plan shall be made when an infant is not stable or not improving, as documented in the feeding plan. Changes should address improving the comfort and safety, as well as ability to eat appropriate volumes.</p>					

Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>10.4: Interprofessional feeding management shall be driven by information gathered, consistently applied, and regularly updated in the application of the baby's individualized feeding plan.</p> <p>10.5: Interprofessional feeding management shall be driven by the m/other's expressed desires (to breast feed and/or bottle feed), as well as the baby's stability and behavioral communication during feedings.</p>					
Std 11: Feeding management shall consider short and long-term growth and feeding outcomes.	11.1: Feeding shall be seen as a neurodevelopmental progression, with the ICU building a foundation for further learning/					

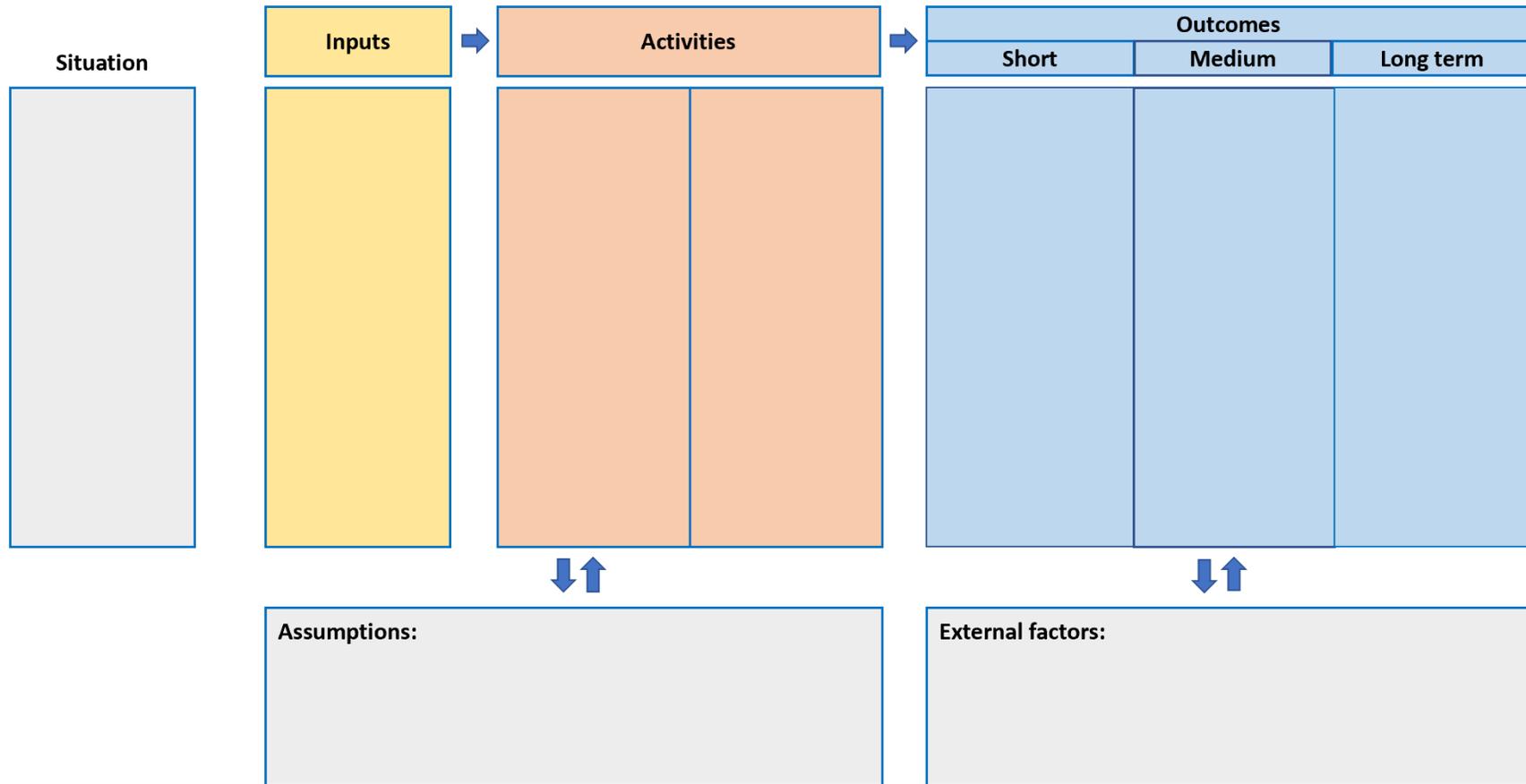
Standard	Competencies	Identified gaps or challenges in implementing this standard	How easy will it be to implement this change?	Impact (Low=1, Medium=3, High=5)	Effort (Low=1, Medium=3, High=5)	Rank/Prioritize
	<p>development around eating.</p> <p>11.2: Professional services shall be made available to families to ensure optimal nutrition after discharge whether breast, bottle, tube feeding, or a combination of those feeding approaches.</p> <p>11.3: Post-discharge, feeding outcomes shall be monitored to inform care, document outcomes, and assess potential changes in feeding approaches.</p>					

-First Fragile Infant Forum for Integration of Standards – Infant and Family Centered Developmental Care Best Practices for Feeding, Eating, and Nutritional Delivery, July 13-15, 2022, Monrovia, CA. Supported by Loma Linda Publishing Company, University of South Florida College of Public Health, and PACLAC.

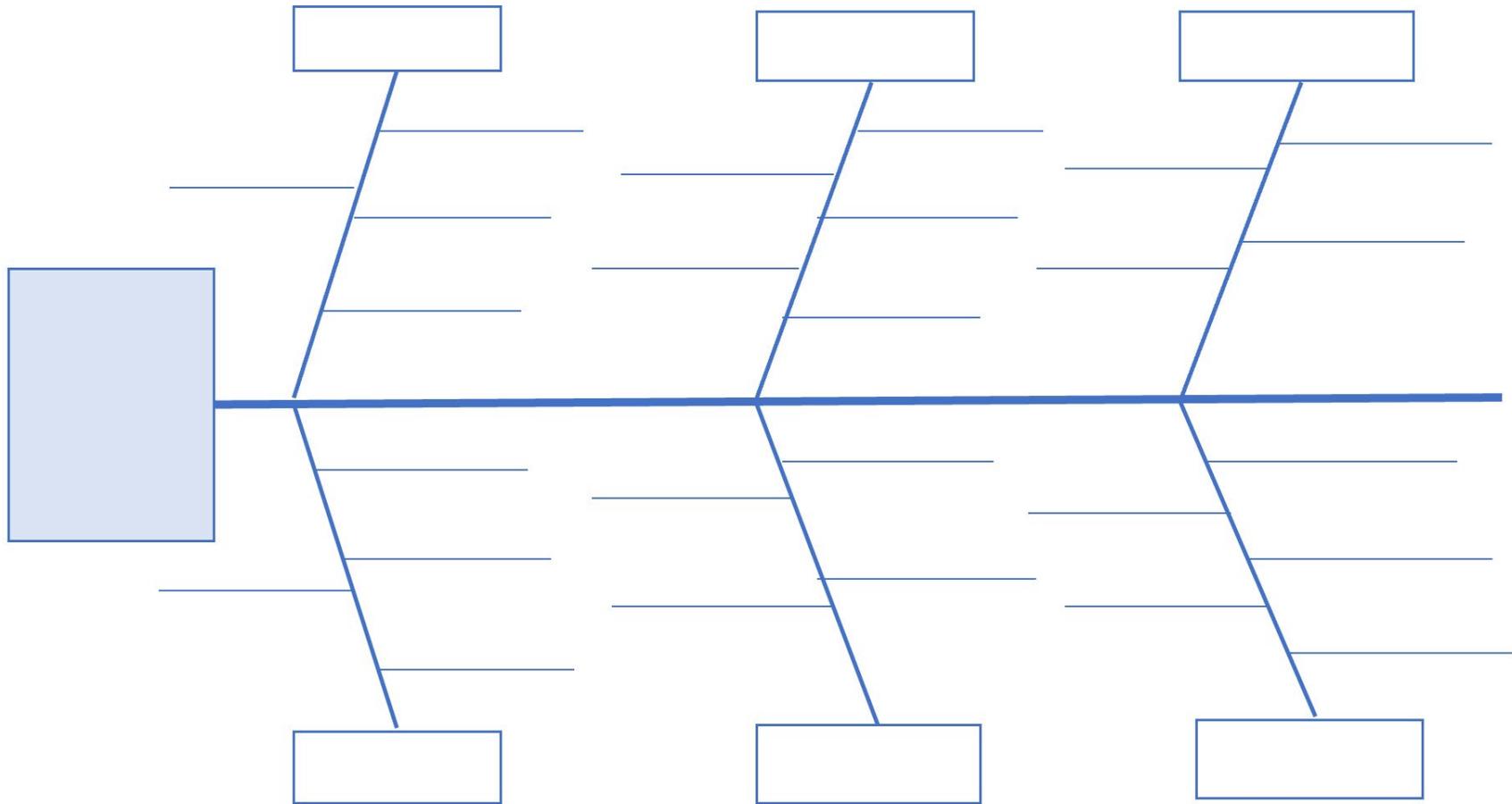
-Consensus Committee on Infant Family Centered Developmental Care. Report of the First Consensus Conference on Standards, Competencies and Best Practices for Infant and Family Centered Care in the Intensive Care Unit. <https://nicudesign.nd.edu/nicu-care-standards/> ; February 2020.

Appendix B

Logic Model Template



Fishbone Diagram



Project Brief/Initiative: _____

AIM/PROBLEM - What are we trying to accomplish?

MEASURES - How will we know that our change is an improvement?

CHANGE IDEAS - What changes can we make that will result in the improvement we seek?

Types of Measures	
Qualitative	Quantitative

Key Driver Diagram

