Through collaborative use of improvement science methods, reduce preterm births & improve perinatal and preterm newborn outcomes in Ohio as quickly as possible.
NICU Graduates Project Overview

• Quality improvement (QI) initiative to improve the transition from NICU to home for infants with complex health care needs and/or technology dependence.
NICU Graduates

• Teams from the 6 Ohio Children’s Hospitals will develop and test tools and strategies for integrated care coordination and family-centered care and education.
• The tools and strategies will aim to:
  – Support a coordinated transition of care plan
  – Ensure timely and appropriate home care services
  – Facilitate a family-centered care approach with a standardized and comprehensive transition to home readiness assessment
  – Integrate shared decision making among key neonatal care servicing entities, families and caregivers
  – Educate, engage and support families throughout the process of transitioning to home care
NICU Graduates Population Target

• Infants with complex needs, such as:
  – Tracheostomy and Ventilators
  – Tracheostomy without Ventilators
  – Gastrostomy Tubes (G-Tubes)

• We expect that many of the tools and strategies that we develop will also be used for other neonatal populations.
NICU Graduates

• How will we improve the transition from NICU to home for these children?

• How do we?
  – Change how we work
  – Produce a positive difference in results and outcomes
  – Have a lasting impact
Five Fundamental Principles of Improvement

1. Knowing why we need to improve
2. Having a feedback mechanism to tell us if the improvement is happening
3. Developing an effective change that will result in an improvement
4. Testing a change before attempting to implement
5. Knowing when and how to make the change permanent
Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What changes can we make that will result in improvement?

Act  Plan

Study  Do
Model for Improvement

- May be applied to informal or very complex improvement efforts
  - Amount of documentation
  - Complexity of tools used
  - Extent of measurement
Model for Improvement

1) What are we trying to accomplish?
   - Change how we work
   - Create a positive difference in results or outcomes
   - Have a lasting impact
2) How do we know that change is an improvement?

- Observe the system
- Measurement
  - Data before and after the change
  - Outcome measures
  - Process measures
  - Balancing measures
### Aim Statements

- **Answer the question:**
  - What are we trying to accomplish?

- **Include the measure which answers the question:**
  - How will you know a change is an improvement?

<table>
<thead>
<tr>
<th>What are we trying to accomplish?</th>
<th>How will we know that a change is an improvement?</th>
</tr>
</thead>
<tbody>
<tr>
<td>What changes can we make that will result in improvement?</td>
<td></td>
</tr>
</tbody>
</table>
Global Aims

• Broad objectives describing what we are trying to accomplish

• Example: “Finish writing my novel by the end of the year”

OR

• “Improve the transition of medically complex infants from the NICU to home”
SMART Aim Statements

- **S** – Specific (clearly stated)
- **M** – Measurable (measurable numeric goals)
- **A** – Actionable (within the control/influence of your team)
- **R** – Relevant (aligned with the organization’s priorities)
- **T** – Time bound (specific time frame)
Developing a SMART Aim

- **AIM:**
  - We will increase/decrease (e.g. my weight)
  - ___________________________________
  - ___________________________________
  - ___________________________________
  - ___________________________________

- From (e.g. 150 lbs.): _______________________________

- To (e.g. 120 lbs.):______________________

- By (e.g. June 30):_____________________
  - Date

- Population Impact/ Target Audience for the Improvement (e.g. me):______________________
SMART Aim

• Example:

  – “I will increase the number of words I write for my book from 100 words/day to 500 words/day by July 1st, 2016.”
Model for Improvement

3) What changes can we make that will result in improvement?
   • Develop and test changes immediately
   • May require extensive research and design
Model for Improvement

- Plan-Do-Study-Act Cycles
  - Competes the Model for Improvement
  - Turn ideas into action
  - Connect action to learning
  - Builds knowledge

What are we trying to accomplish?

How will we know that a change is an improvement?

What changes can we make that will result in improvement?
PDSA Cycles

**Plan**
- Objective
- Questions and predictions (Why?)
- Plan to carry out the cycle (who, what, where, when)
- Plan for Data collection

**Do**
- Carry out the plan
- Document problems and unexpected observations
- Begin analysis of the data

**Study**
- Complete the analysis of the data
- Compare data to predictions
- Summarize what was learned

**Act**
- What changes are to be made?
- Next cycle?
PDSA Cycles

1) Plan
   – Plan the learning opportunity
   – What question will be answered by the test?
   – What do we predict will happen? Why?
   – How will data be collected?
   – How will the test be carried out (who, what, where, when)?
PDSA Cycles

2) Do

- The test was carried out
- Observations are made and recorded, both intended and unintended
3) Study

- Data is analyzed
- Observations are discussed
- Results are compared to predictions
- Summarize learnings
PDSA Cycles

4) Act

– Take action based on learnings
– What changes will be made for the next test?
– Adapt, adopt or abandon?
Planning PDSA Cycles

• Think “small” and “big”
  – Tests of change
• Think a couple of cycles ahead of the initial test (future tests, implementation)
• Scale down the size and decrease the time required for the initial test
• Recruit volunteers for the initial tests
• Use temporary supports for tests
• Measure
Use of PDSA cycles

Changes That Result in Improvement

Implementation of Change

Wide-Scale Tests of Change

Follow-up Tests

Very Small Scale Test

Data

Evidence Best Practice Testable Ideas

Use of PDSA cycles
Key Driver Diagram

• Organizes the “theory of improvement” for a specific project.

• Connects the aim, key drivers, and interventions (change concepts) to create a “Learning Structure”.

• Helps to focus the selection of changes to test by identifying the key drivers

• Serves as a communication tool to present the work
Key Drivers

• Ideal = evidence or data based

• Level of abstraction
  – High enough level to allow creativity in generating ideas for interventions
  – Low enough to provide concrete guidance for testing

• Key drivers are the **WHAT**, interventions are the **HOW**.

• Important to revisit as you understand the project more

• By convention they should be stated in the affirmative.
Why is Organizing the Theory of Improvement Important?

- Makes thinking explicit in the form of a hypothesis
- Begins to identify “root cause” by identifying “categories” of causes, or drivers
- Provides a roadmap to help the improvement team to focus on testing interventions that will ensure the aim is achieved
Risks in Not Building Theory First

• Inability to link all the thinking and demonstrate cause and effect; I do “this” (intervention) and “this” (aim) moves

• Making or accepting invalid assumptions

• Inability to learn effectively from the tests

• Lack of shared mental model
Identifying Key Drivers

If no evidence or data-based drivers are known, ask what is necessary to achieve this aim?

Consider the following:

– Process steps
– An element of system structure
– Known failure modes (flip to the positive)
Validating Your Key Drivers

- Evidence
- Data
- Observation of the process
- Interviews
- Discussion with your team who are directly involved with the process
**NICU Graduates**

- How do we apply the Model for Improvement to the NICU Graduates project?

<table>
<thead>
<tr>
<th>What are we trying to accomplish?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How will we know that a change is an improvement?</td>
</tr>
<tr>
<td>What changes can we make that will result in improvement?</td>
</tr>
</tbody>
</table>
What are we trying to accomplish?

• Global Aim:
  “Infants with complex needs will have optimal care and outcomes as a result of improved and sustained support for families during and after NICU stays, resulting in being successfully cared for at home.”
How will we know a change is an improvement?

• SMART Aim: By June 30, 2017, NICU infants with complex needs will successfully transition to home care

• As measured by:
  – Decreased average time by 10% from initiation of clinical intervention (trach/vent/g-tube) to care at home
  – Decreased avoidable unplanned readmissions by 10% within 7 days of discharge
  – Family/parent/caregiver measures TBD
**SMART Aim**

By June 30, 2017, NICU infants with complex needs will successfully transition to care at home, as measured by:

- Decreased average time from initiation of medical intervention (trach/vent/g-tube) to care at home by 10%
- Decreased avoidable unplanned readmissions within 7 days of discharge by 10%
- Family/parent/caregiver measures TBD

**Global Aim**

Infants with complex needs will have optimal care and outcomes as a result of improved and sustained support for families during and after NICU stays, resulting in being successfully cared for at home.

**NICU Graduates**

**Key Driver Diagram (KDD)**

Project Leader(s): Kristin Voos and Dan Benscoter

Revision Date: 4/28/16
Understanding Best Practices

- Literature Based Evidence Review
- Stakeholder Interviews
- Identifying Change Packages
- Systems Inventory
Evidence Review:
Transitioning from NICU to home

• Welcome families as partners in the transition to home process
• Assure family involvement and care in decision making
• Encourage parents to independently and confidently care for their infant
• Facilitate infant-family attachment
• Involve parents who previously had a neonate graduate from the NICU (peer-to-peer)
Evidence Review:
Transitioning from NICU to home

• Determine family’s caregiving and psychosocial readiness for their infant’s transition to home
• Encourage families to play an active role in transition to home planning
• Provide comprehensive education and support prior to and follow during transition to home
• Use a variety of educational formats, reinforce earlier education, and repeat multiple times
Evidence Review:
Transitioning from NICU to home

• Enhance transfer of information between the family and healthcare team during hospitalization and after transition to home
• Arrange home visits providing education support and nursing care as needed
• Maintain communication between home visits
• Provide emotional support and facilitate the development of social networks with families
Evidence Review:
Transitioning from NICU to home

• Provide systematic, multi-disciplinary team family centered care team approach
  – including primary care, other members of the welfare and health care system
  – parental counseling, from pregnancy to their home for first 12 weeks after discharge
  – discharge planning with coordinated follow up visits

• Ensure appropriate follow up plan is in place before transition to home, plan is communicated and understood by parents and follow up team

• Identify community resources and supports
Evidence Review: Improved Outcomes

• Decreased hospital length of stay and cost
• Increased infant growth
• Improved parent mental/emotional health
• Enhanced Parent-Infant interaction
• Increased caregiver confidence in caring for their newborn
• Increased parental engagement in neonate’s care and transition to home
• Increased parent satisfaction and support
• Improved staff satisfaction
Stakeholder Interview Themes: Families

- Transition from NICU to home

  - Challenges
    - *Lack of confidence*: Concern as a parent that he/she would do something tragically wrong in caring for child
    - Needing more connection to hospital and patient/family support after discharge
    - Increased education/preparation prior to discharge
    - Follow-up appointments can be difficult to coordinate
    - Coordinating/ensuring insurance coverage and access to other services
Stakeholder Interview Themes: Families

• Parent wish list for ideal transition
  – Better parent education, early, often and repeated
  – More check-ins to provide continuity of care and build confidence
    • Innovative ways to connect including home visits and telecommunications
  – Parent-to-Parent mentoring programs
  – Screening for personal anxieties and social needs
Stakeholder Interview Themes

- Organizational wish list for ideal transition
  - More time and preparation for discharge
  - Primary Care Providers
    - Need to provide better continuity of care, education, understanding of what child needs, and communication with Children’s Hospital
    - Need to verify that they can care for a child with special needs prior to transition
**SMART Aim**

By June 30, 2017, NICU infants with complex needs will successfully transition to care at home, as measured by:

- Decreased average time from initiation of medical intervention (trach/vent/g-tube) to care at home by 10%
- Decreased avoidable unplanned readmissions within 7 days of discharge by 10%
- Family/parent/caregiver measures TBD

**Global Aim**

Infants with complex needs will have optimal care and outcomes as a result of improved and sustained support for families during and after NICU stays, resulting in being successfully cared for at home.

**Key Drivers**

- Early identification of need for medical intervention (trach, vent, g-tube)
- Strengthened family capacity for care through transition to home preparation
- Early and standardized process for transition to home
- Prepared Primary Care Providers and community to care for infants with complex needs
- Enhanced coordination of care through an established medical home to

**Interventions**

- **Caregiver education during hospitalization**
  - Employ learning style assessment
  - Provide education early, often and repeated
  - Use of simulation technology, teach-back method, journey board
  - Provision of red flag action plan
- **Assessment of family’s emotional needs**
- **Develop peer to peer social support and activated parent community**
- **Continuous support from sub-specialty team after transition to home**
  - Plan for and utilize technology to connect families & providers after transition to home, consider e-mail and telemedicine
- **Enhanced understanding of public resources available**
  - Create tools including inventory and exchange to help families fully engage with and utilize resources
- **Identify early triggers for waiver program & begin application process**
- **Ensure qualified home nursing availability**
  - Develop guidelines for home nursing care
  - Assist the state in creating and standardizing reassessment tools matching home nursing services appropriate with the child’s needs
  - Quantify gap in home nursing and draft/promote public policy to increase pool of home nurses
- **Ensure access to Durable Medical Equipment support & resources**
  - Standardize checklists for DME with best practices
  - Ensure availability of other emergency equipment
  - Establish early contact with DME providers
- **Standardize hand off between Children’s Hospital and PCP, with standard template including:**
  - Phone call prior to transition home with entire team including current provider (pulmonologist/neonatologist), family caregivers/parents, and PCP
  - Discharge notes and red flag action plan provided to PCP in timely manner
- **Aligned incentives for hospitals, provider, insurers, and families**

**Revision Date:** 4/28/16
Practice Variation

• Systems Inventory conducted Feb 2016 to:
  – Understand characteristics of your practice that support transition from NICU to home for infants with complex needs
  – Track changes in practices, as organized by change strategies and key drivers
  – Help inform design of the NICU Graduates project, including potential interventions to develop and test

• Expectation was that most teams would not currently have many of these processes in place
Key Driver #1: Early identification of need for medical intervention (trach, vent, g-tube)
Key Driver #2: Strengthened family capacity for care through transition to home preparation
Key Driver #2: Strengthened family capacity for care through transition to home preparation

OPQC NICU Graduates Project
Aggregate
Systems Inventory February 2016
Section 2 (Part 2): Strengthened family capacity for care through transition to home preparation
Key Driver #3: Early and standardized process for transition to home
Key Driver #4: Prepared Primary Care Providers & community to care for infants with complex needs

OPQC NICU Graduates Project
Aggregate Systems Inventory February 2016
Section 4: Prepared Primary Care Providers and community to care for infants with complex needs

- We use a handoff tool with Primary Care Providers (PCP) for infants with complex needs: 100%
- We have a patient registry for infants with complex needs: 33%
- We have a joint phone call with members of the hospital care team, families or caregivers AND the infant’s PCP prior to transition to home: 67%
- We automatically send discharge notes to the PCP: 100%
- We provide the PCP with a copy of the family’s red flag action plan: 83%
Key Driver #5: Enhanced coordination of care through an established medical home

[Chart showing percentages of yes and no responses]
Key Driver #1: Early identification of need for medical intervention (trach, vent, g-tube)

Proposed interventions

• Identify, develop and implement standards to optimize decision to trach, including family readiness and infant’s medical readiness
Key Driver #2: Strengthened family capacity for care through transition to home preparation

Proposed interventions

• Caregiver education during hospitalization
  – Employ learning style assessment
  – Provide education early, often and repeated
  – Use of simulation technology, teach-back method, journey board
  – Provision of red flag action plan

• Assessment of family’s emotional needs

• Develop peer to peer social support and activated parent community

• Continuous support from sub-specialty team after transition to home
  – Plan for and utilize technology to connect families & providers after transition to home, consider e-mail and telemedicine
Key Driver #3: Early and standardized process for transition to home

Proposed interventions

• Enhanced understanding of public resources available
  – Create tools including inventory and exchange to help families fully engage with and utilize resources

• Identify early triggers for waiver program & begin application process

• Ensure qualified home nursing availability
  – Develop guidelines for home nursing care
  – Standardize reassessment tools to evaluate continued eligibility for home nursing
  – Quantify gap in home nursing and draft/promote public policy to increase pool of home nurses

• Ensure access to Durable Medical Equipment support & resources
  – Standardize checklists for DME with best practices
  – Ensure availability of other emergency equipment
  – Establish early contact with DME providers
Key Driver #4: Prepared Primary Care Providers & community to care for infants with complex needs

Proposed interventions

• Standardize hand off between Children’s Hospital and PCP, with standard template including:
  – Phone call prior to transition to home with entire team including family, emergency workers, and managed care coordinator
  – Discharge notes and red flag action plan provided to PCP in timely manner
Key Driver #5: Enhanced coordination of care through an established medical home

Proposed interventions

• Assign role of care coordinator/point person and ensure family is aware of who this person is
NICU Graduates

• Continue to learn
• Discuss data collection
• Team time to discuss opportunities