Perspectives on Feeding From NICU and Beyond

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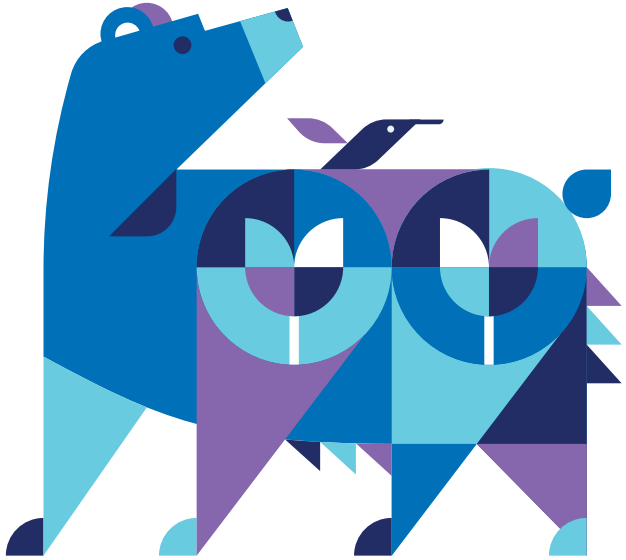
St Luke's Children's

Agenda

- Introduction
- Review of Feeding Program at St. Luke’s
- Review of aspiration and improving screening methods
- Next Steps & Takeaways



Introduction

Kristin Booton, MS SLP CCC

Practicing for 20 years, 10 years here at Luke's

- Worked in Austin (Dell Children's) and Portland (Providence, Shriners, and Portland Public Schools)
- IP SLP, VFSS, Trach and Vent team, Craniofacial team
  - Feeding Team in the past
- Worked in all zones for pediatric care (IP, home, OP, schools, IRU, long term care)
- No disclosures

Objectives

1. List at least 3 subtle signs of aspiration an infant could show.

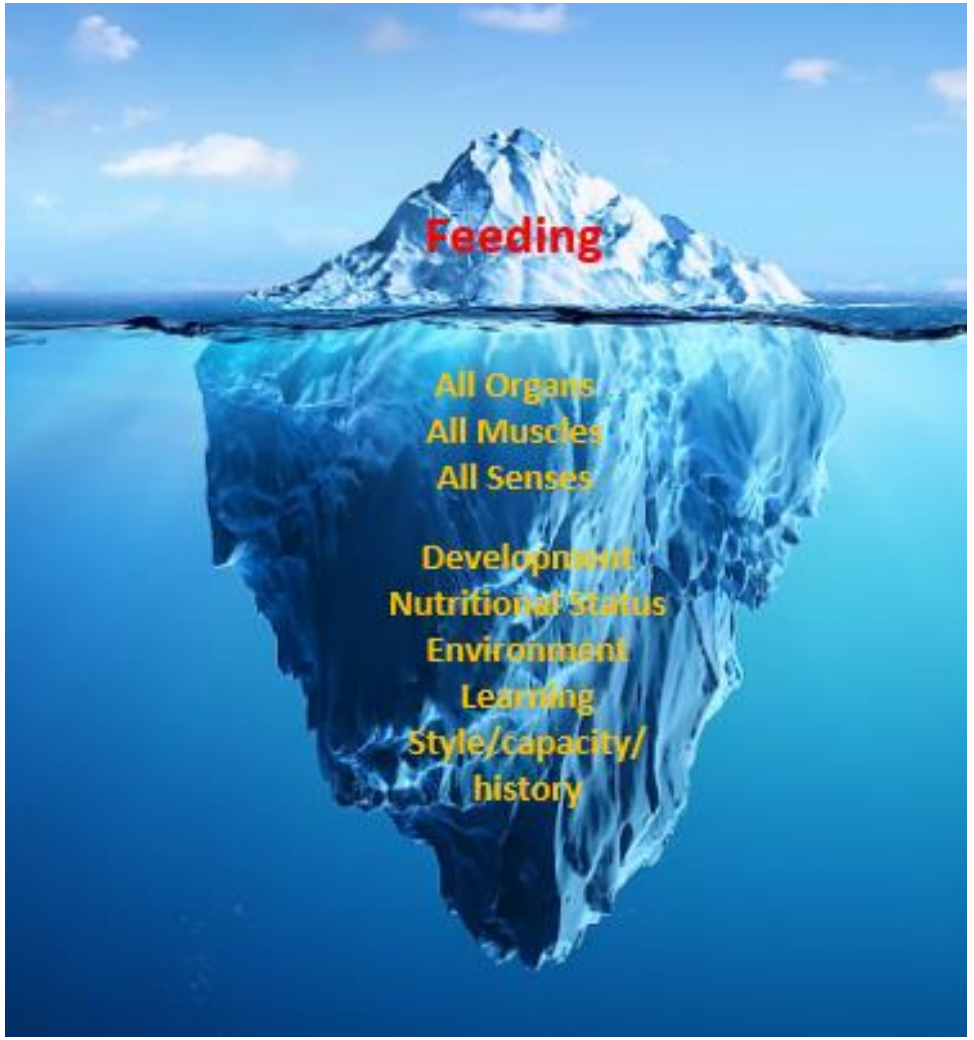
2. List at least 3 concerns for when to refer for feeding therapy for toddlers and older children.

3. List at least 3 medically complex diagnoses who are at high risk for swallowing difficulty.

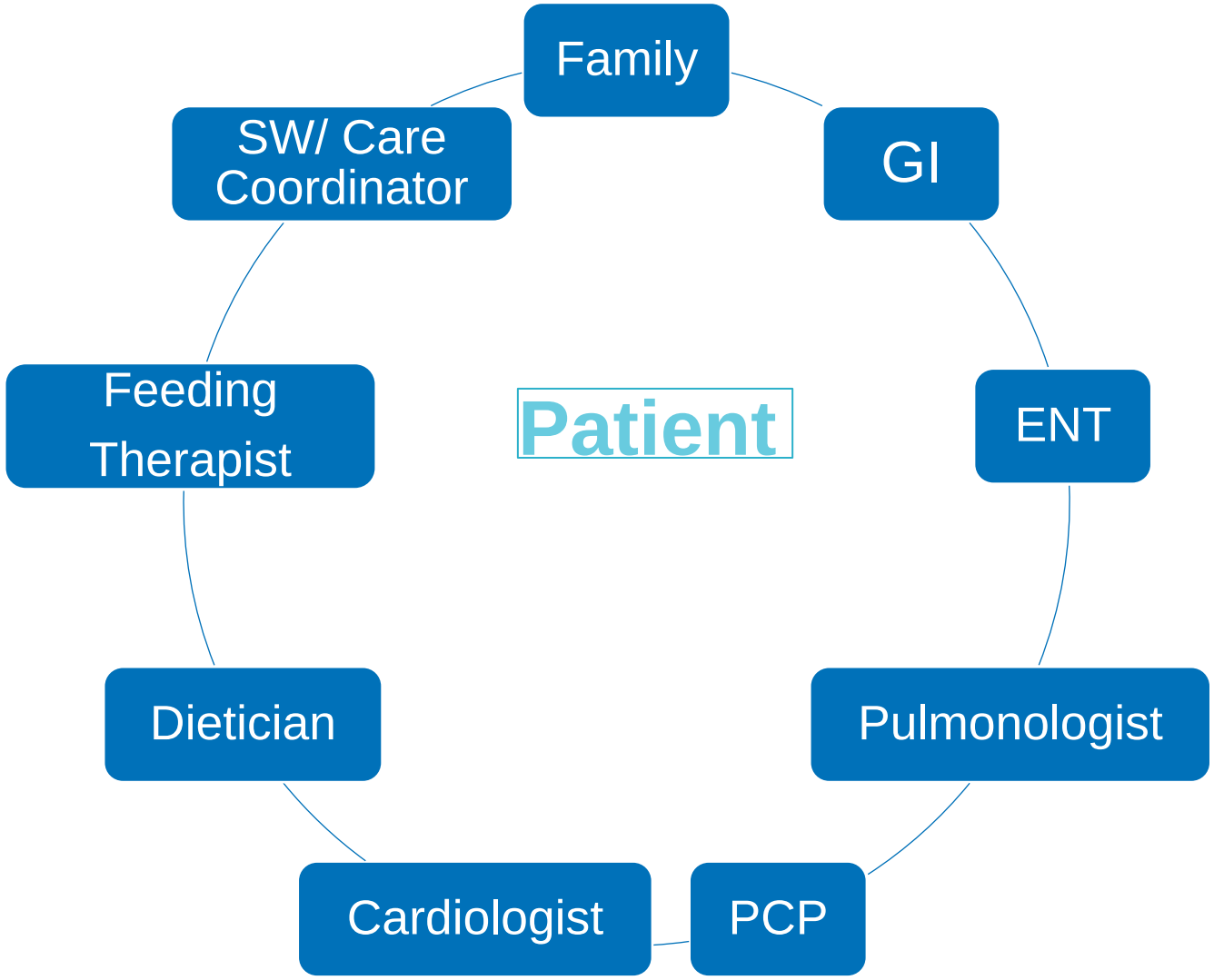
Feeding is a complex task

Aerodigestive Collaboration
- Respiratory
- Swallowing
- Digestion

Engagement/Behaviors/Energy
Sensory processing
Strength/coordination of muscles
Development
Nutrition/Growth
Social situation/trust/capacity for learning/access



Feeding is BEST Managed by a TEAM



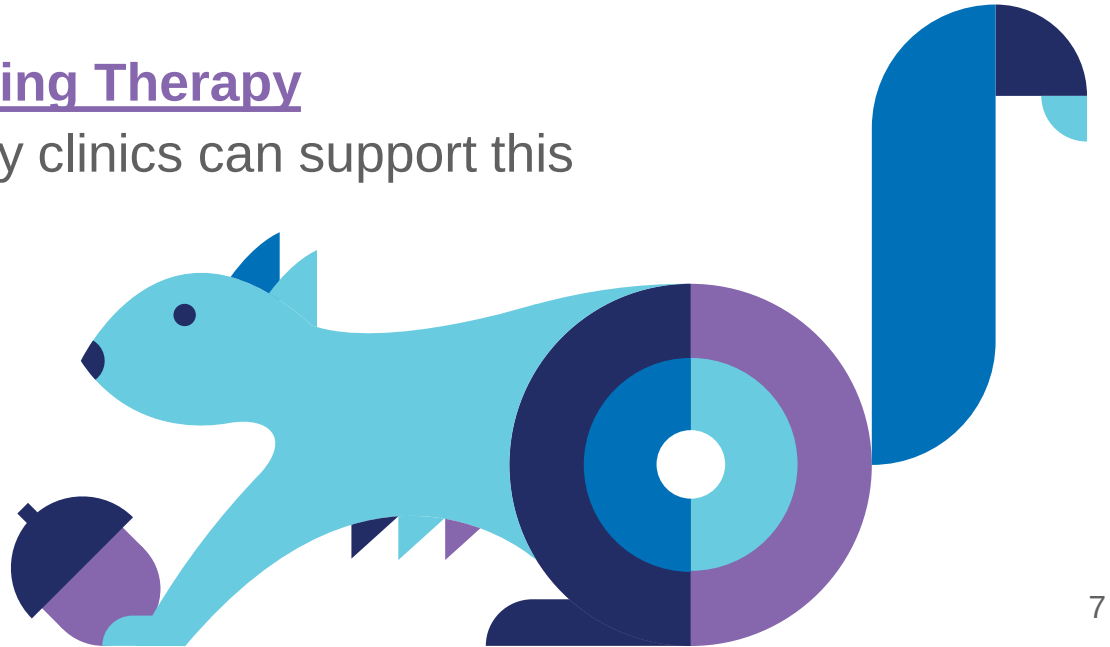
Differences in Feeding Therapy

Medical Based Feeding Therapy

- Specifically trained in dysphagia, aspiration, and strategies
- Increased collaboration with medical team
- More experience with patients who have complex medical diagnoses

Sensory/Developmental Feeding Therapy

- Infant Toddler Program and many community clinics can support this
- Picky eating, no concerns for aspiration
- Slow feeding development



Feeding Program

- Occupational Therapists (OTs) and Speech Language Pathologists (SLPs) complete feeding evaluations and treatments within our system
- Inpatient, Home Care, Outpatient Therapies
  - Also now have Inpatient Rehab Unit
- Videofluroscopic swallow studies (inpatient, outpatient)
- 19 medical based feeding therapists, several others who treat sensory based feeding disorders
- Competencies for infant feeding, older child, and VFSS
- Triaging for referrals for OP and VFSS
- Regular education meetings for all feeding therapists
- Regular presentations to MDs, RNs, rehab staff, etc.

Role of a Skilled Dysphagia Therapist

Feeding skills are re-assessed with each feeding and changing strategies to improve patient safety/success

- Assess state and readiness to engage in eating/feeding
- Assess/treat oral motor ability
- Assess oral reflexes
- Assess/treat functional feeding skills/patterns
- Assess safety while feeding
  - Determining need for further assessments like VFSS
  - Need for other referrals (GI, ENT, etc.)
- Establish a safe feeding plan for home
  - Considering hydration, nutrition, stooling, complex picture
- Caregiver education about feeding development, safety, and strategies recommended
- Support family during the feeding journey
- Provide consultation and feedback to medical team to help guide treatment plan

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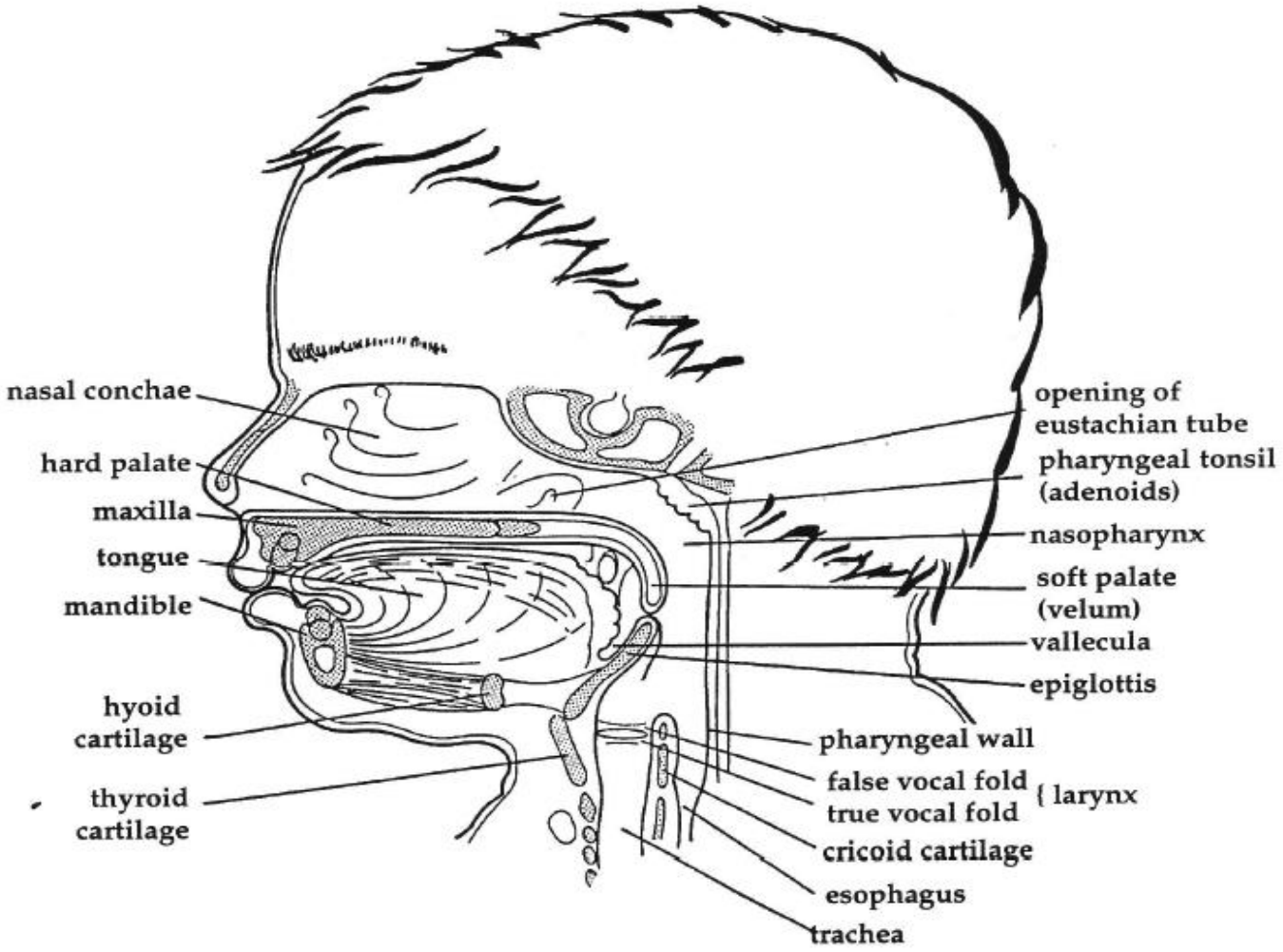
THE MOUTH AND PHARYNX OF THE NEWBORN

(saggital section)



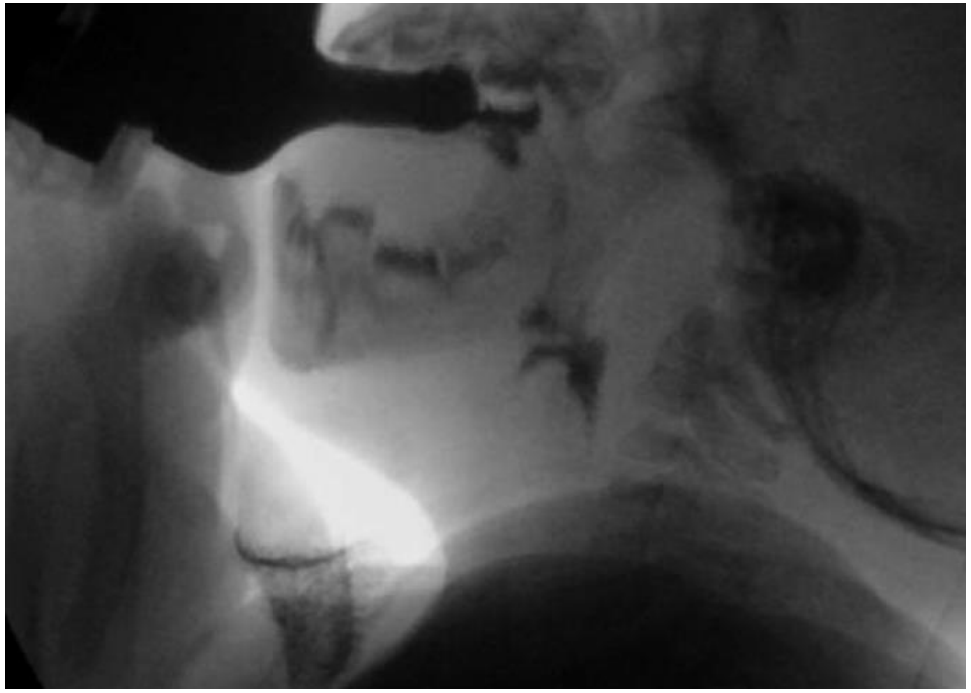
Examples of VFSS

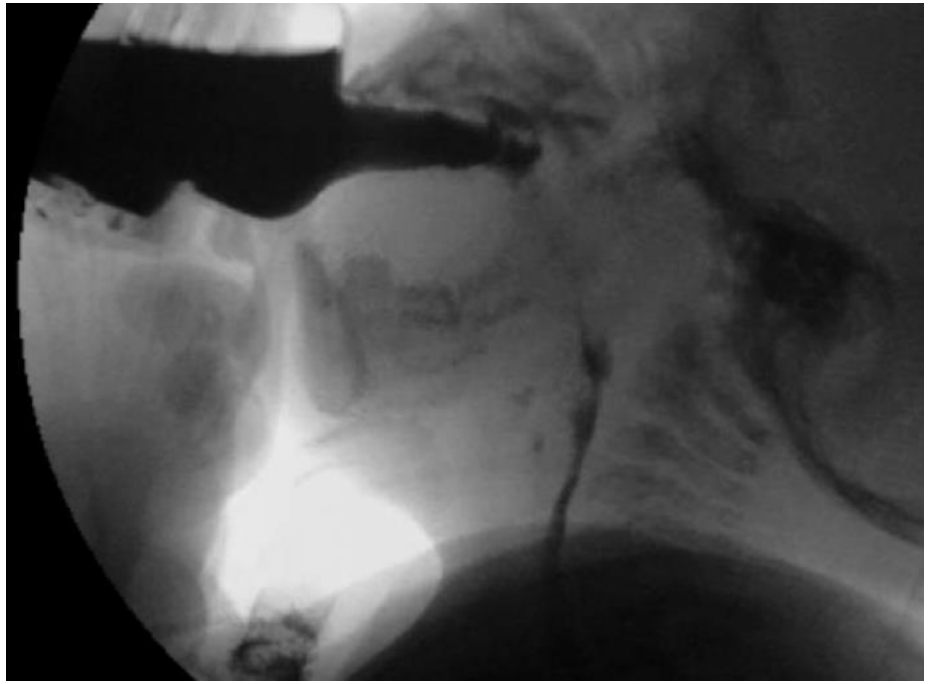
Video of Normal Infant VFSS

https://youtu.be/3Ql8GrGzP5A

Video of Infant VFSS with Aspiration

Video 2 – Abnormal swallowing in an infant. (Severe pharyngeal phase dysphagia.) (youtube.com)





Improve Monitoring for Feeding Difficulty

Overt Signs:

- Coughing/choking
- Desaturations
- Apnea

Infants under 1 year of age are more likely to experience aspiration without cough response

Subtle Signs:

- *Wetness to breathing/voicing; wet vocal quality*
- *Audible swallows/gulping*
- *Increased congestion, especially pharyngeal congestion*
- *Disrupted breathing while eating (faster, slower, pauses in breathing)*
- *Difficulty gaining weight*
- *Watery eyes, redness around the eyes/color changes*
- *Poor secretion management*
- *Weak sucking*
- *Slight fever after feedings*
- *Stridor/wheezing*
- *Prolonged feedings/reduced engagement/changes in alertness*
- *Pulling away from bottle/breast; avoidance behaviors*
- *Facial stress cues*
- *Changes in tone*

Frequency of Swallowing Dysfunction <1yr

- ✓ *Premature infants: 25.7%*
- ✓ *BPD: 30.7%*
- ✓ *Chronic heart disease: 37%*
- ✓ *Syndromes: 46.9%*
- ✓ *Neurologic: 55.3%*
- ✓ *Esophageal atresia: 24.8%*
- ✓ *General population: 13.4%*

* Not every patient is going to walk or talk. We cannot expect every patient to swallow safely. *

- ✓ *80% of children with developmental disabilities have feeding problems*
- ✓ *GERD is the most common disorder associated with these disorders*
  - *High correlation of dysphagia and food refusal in setting of GERD*

Mercado-Dean, MG. Et al. Swallowing Dysfunction in Infants less than 1 year. Pediatric Radiology. 2001;31; 423-428.

Why talk about aspiration?

- Improve patient safety and successful feeding outcomes
- Patients with swallowing difficulties are at a higher risk of:
  - ✓ *Respiratory illnesses/complications*
  - ✓ *Increased visits to doctors and specialists*
  - ✓ *Longer hospital admissions*
  - ✓ *Long-term feeding deficits*
  - ✓ *Long-term pulmonary effects*
  - ✓ *Use of feeding tubes*
  - ✓ *Developmental delays*
  - ✓ *Increased family stress*
- Higher cost for families, hospitals, and clinics

Infants and Children Need Individualized Plans

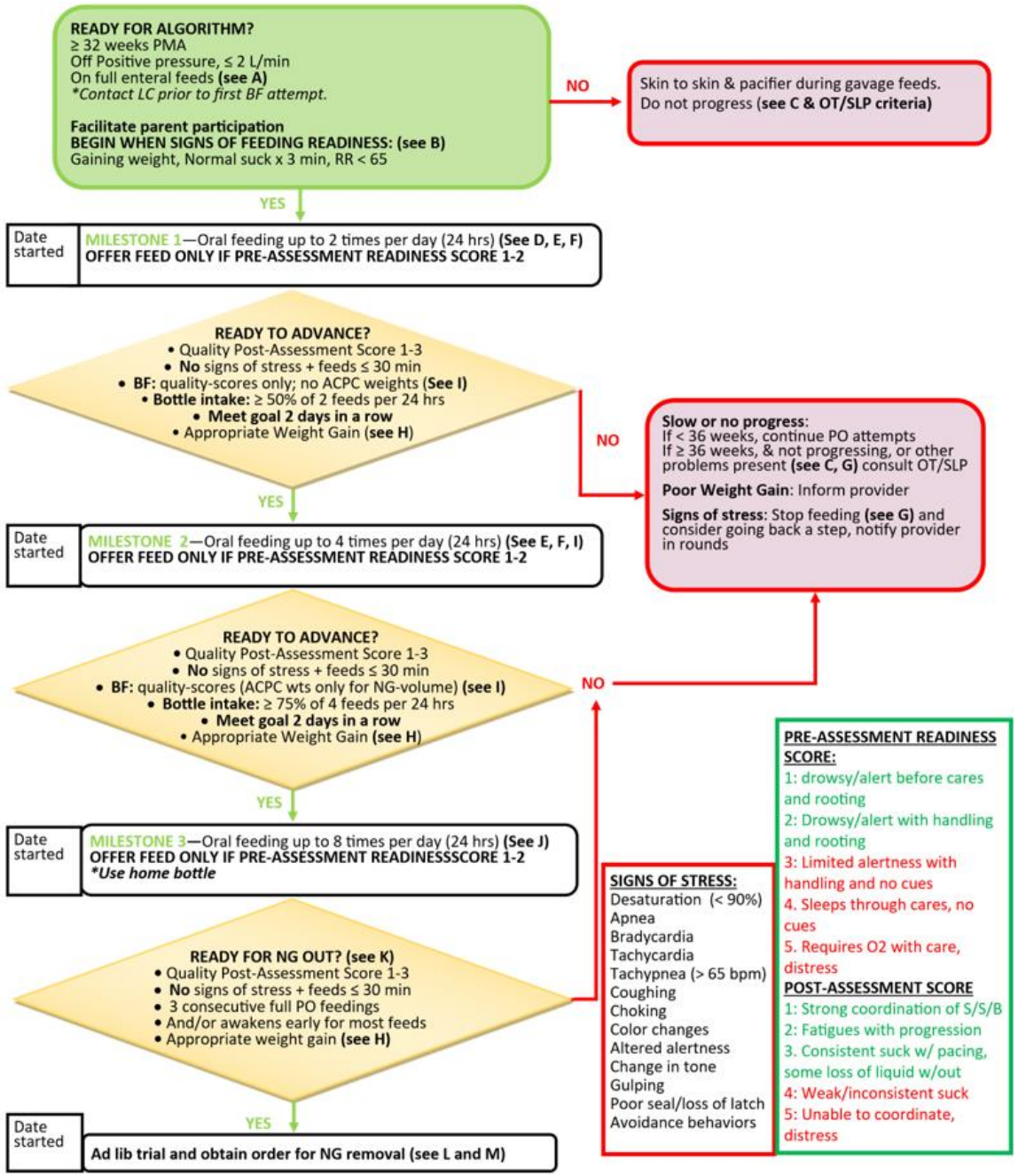
- Babies and children are all different shapes and sizes, and are constantly growing/changing
- Infants and children typically don’t get pneumonia right away
- Chest x-rays typically won’t show aspiration until it builds up over time
- Infants under 1 year of age, typically experience silent aspiration
- Some babies have more negative complications from aspiration than others
- Some families have improved feeding capability to improve interactions before too much stress occurs

NICU Orders

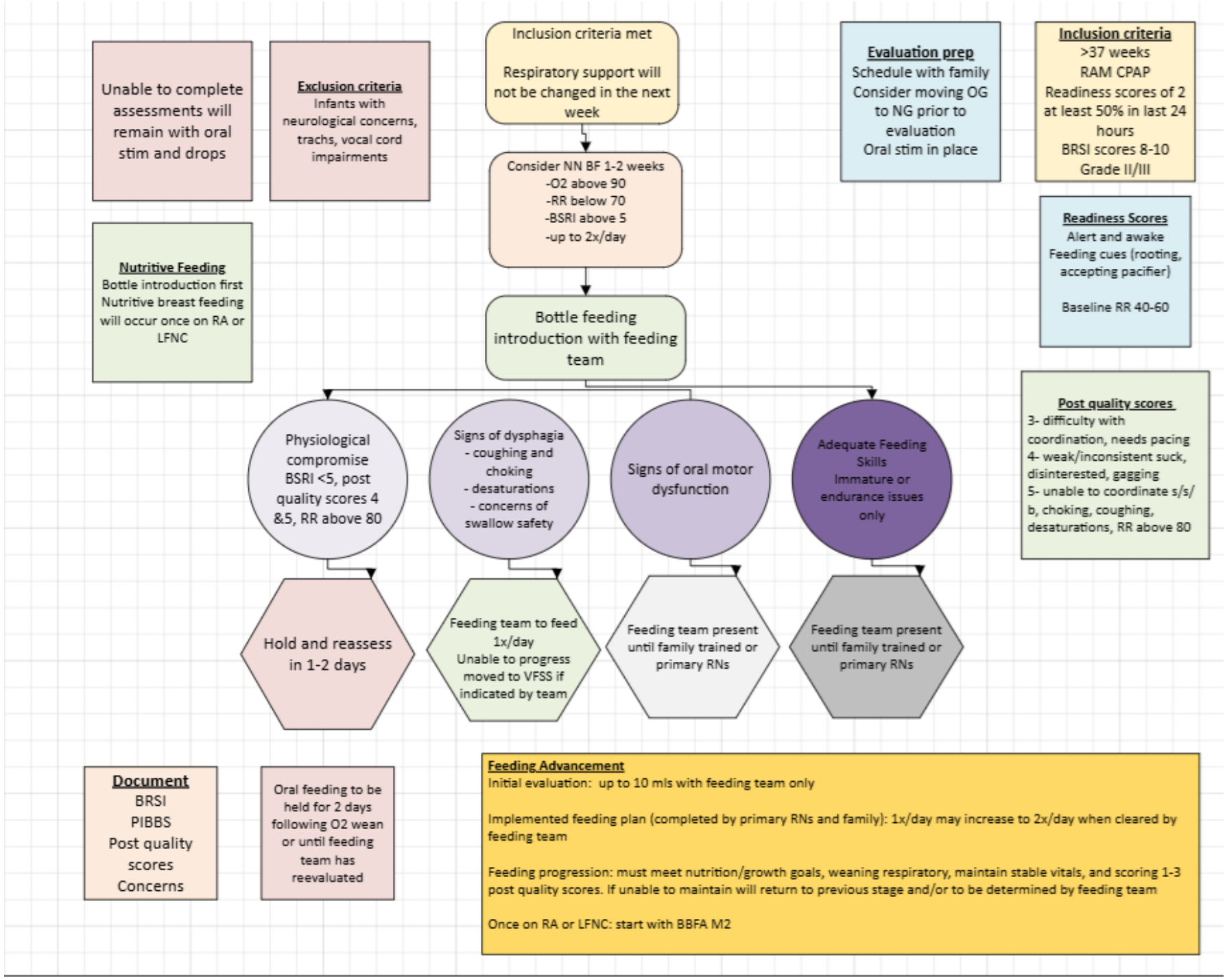
- Automatic orders for certain diagnoses
  - ✓ *HIE*
  - ✓ *TEF*
  - ✓ *Cleft/craniofacial*
  - ✓ *Moderate to Significant BPD*
  - ✓ *Born under 30wks gestation*
  - ✓ *Genetic diagnosis*
- Referrals if baby is not progressing in quality or quantity of intake after 35wks

Breast and Bottle Feeding Algorithm

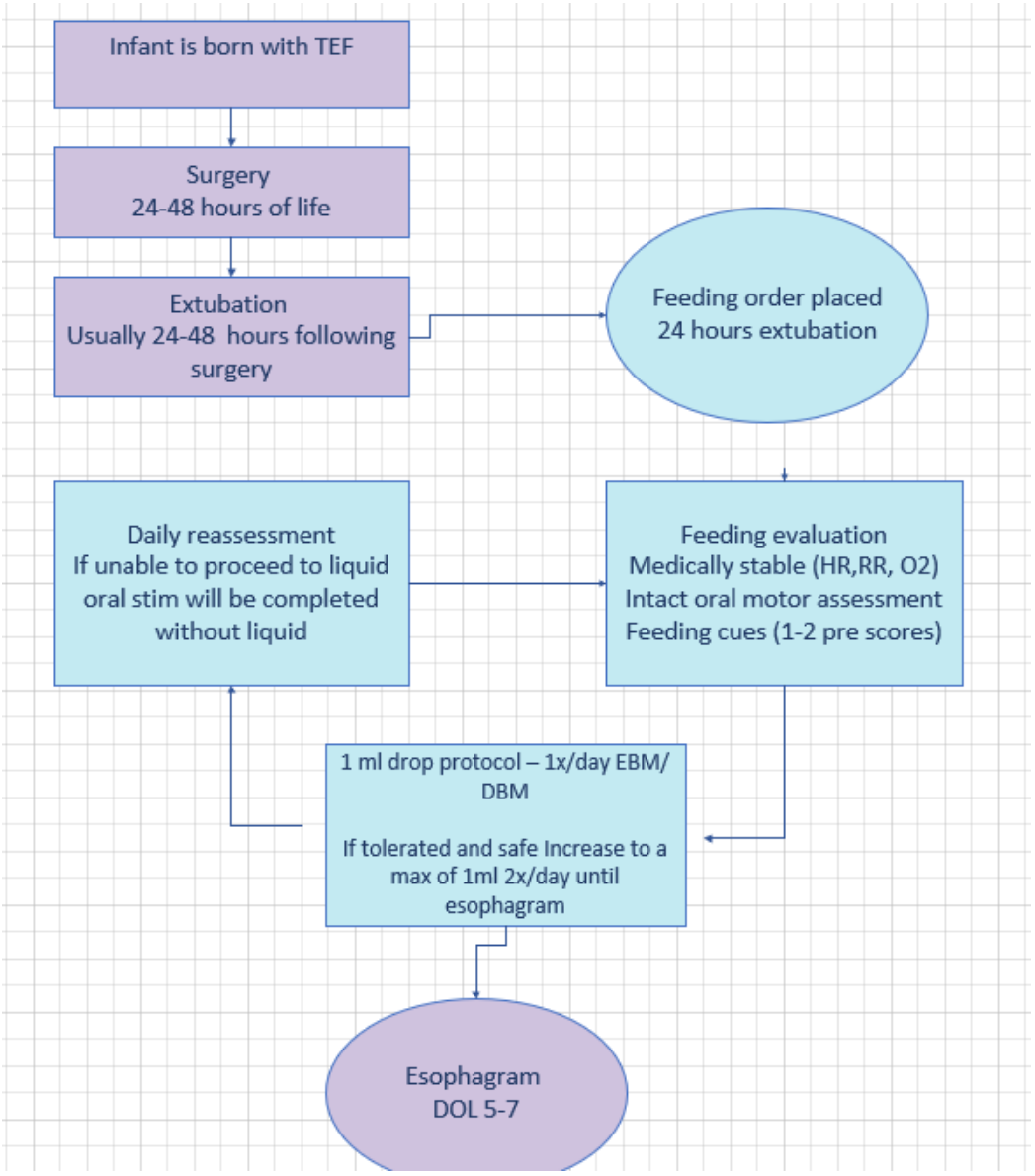
Premature infants <34wks

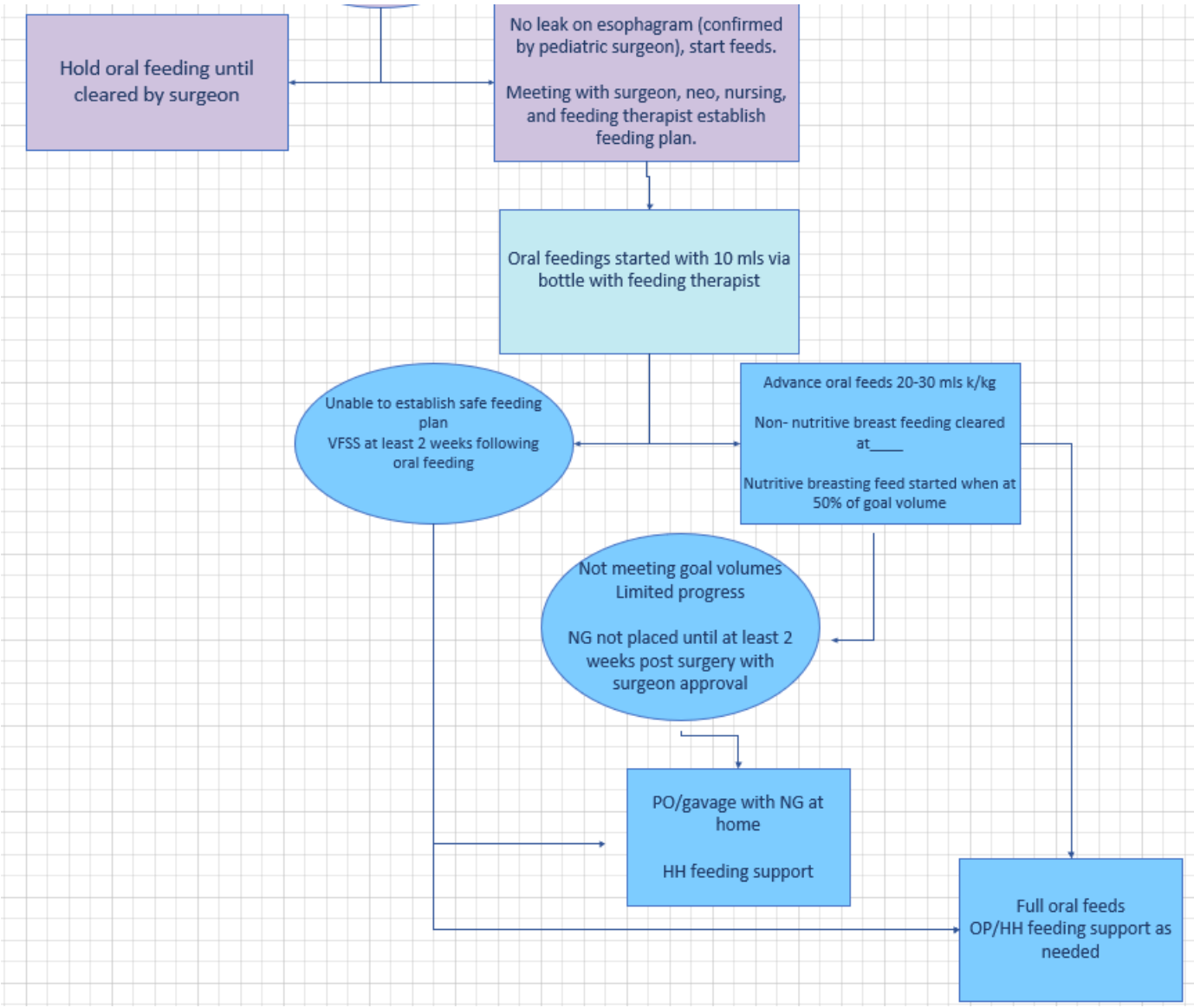


BPD Pathway


Unable to complete assessments will remain with oral stim and drops
Exclusion criteria
Infants with neurological concerns, trachs, vocal cord impairments
Inclusion criteria met
Respiratory support will not be changed in the next week
Consider NN BF 1-2 weeks
-O2 above 90
-RR below 70
-BSRI above 5
-up to 2x/day
Bottle feeding introduction with feeding team
Evaluation prep
Schedule with family
Consider moving OG to NG prior to evaluation
Oral stim in place
Inclusion criteria
>37 weeks
RAM CPAP
Readiness scores of 2 at least 50% in last 24 hours
BRSI scores 8-10
Grade II/III
Readiness Scores
Alert and awake
Feeding cues (rooting, accepting pacifier)
Baseline RR 40-60
Nutritive Feeding
Bottle introduction first
Nutritive breast feeding will occur once on RA or LFNC
Physiological compromise BSRI <5, post quality scores 4 &5, RR above 80
Signs of dysphagia - coughing and choking - desaturations - concerns of swallow safety
Signs of oral motor dysfunction
Adequate Feeding Skills
Immature or endurance issues only
Post quality scores
3- difficulty with coordination, needs pacing
4- weak/inconsistent suck, disinterested, gagging
5- unable to coordinate s/s/b, choking, coughing, desaturations, RR above 80
Hold and reassess in 1-2 days
Feeding team to feed 1x/day
Unable to progress moved to VFSS if indicated by team
Feeding team present until family trained or primary RNs
Feeding team present until family trained or primary RNs
Document
BRSI
PIBBS
Post quality scores
Concerns
Oral feeding to be held for 2 days following O2 wean or until feeding team has reevaluated
Feeding Advancement
Initial evaluation: up to 10 mls with feeding team only
Implemented feeding plan (completed by primary RNs and family): 1x/day may increase to 2x/day when cleared by feeding team
Feeding progression: must meet nutrition/growth goals, weaning respiratory, maintain stable vitals, and scoring 1-3 post quality scores. If unable to maintain will return to previous stage and/or to be determined by feeding team
Once on RA or LFNC: start with BBFA M2

TEF Pathway


Infant is born with TEF
Surgery
24-48 hours of life
Extubation
Usually 24-48 hours following surgery
Feeding order placed
24 hours extubation
Daily reassessment
If unable to proceed to liquid oral stim will be completed without liquid
Feeding evaluation
Medically stable (HR,RR, O2)
Intact oral motor assessment
Feeding cues (1-2 pre scores)
1 ml drop protocol – 1x/day EBM/ DBM
If tolerated and safe Increase to a max of 1ml 2x/day until esophagram
Esophagram
DOL 5-7


Hold oral feeding until cleared by surgeon
No leak on esophagram (confirmed by pediatric surgeon), start feeds.
Meeting with surgeon, neo, nursing, and feeding therapist establish feeding plan.
Oral feedings started with 10 mls via bottle with feeding therapist
Unable to establish safe feeding plan
VFSS at least 2 weeks following oral feeding
Advance oral feeds 20-30 mls k/kg
Non- nutritive breast feeding cleared at____
Nutritive breasting feed started when at 50% of goal volume
Not meeting goal volumes
Limited progress
NG not placed until at least 2 weeks post surgery with surgeon approval
PO/gavage with NG at home
HH feeding support
Full oral feeds
OP/HH feeding support as needed

Real vs Assumed Risk

Change language to INFORMED FEEDING

- Real risk: measurable indicator of harm: hospitalizations, pneumonias, weight loss, not progressing of respiratory supports
- Assumed risk: potential for risk from aspiration: not showing adverse affects (yet)
- Not all children will develop initial complications from aspiration
- Team needs to develop and discuss each pt's own risk and monitor for complications

Palmer and Padilla (2022)

Table 1. Guiding questions to support the dysphagia clinician when assessing the level of risk of an adverse event from aspiration.

Risk category	Guiding questions
General health	• Is my patient in poor general health? • Is my patient frail or deconditioned? • Does my patient have reduced cognitive function that impacts swallow safety?
Medical conditions	• Does my patient have reduced respiratory function? • Does my patient have a weak cough? • Does my patient have GERD or GI disease? • Does my patient have a compromised immune system that alters their ability to fight infection?
Oral health	• Does my patient have evidence of oral cavity neglect? • Does my patient have a poor oral care routine?
Dependence for ADLs	• Is my patient dependent on others for oral care? • Is my patient dependent on others for feeding? • Is my patient active and mobile?
Iatrogenic concerns	• Does my patient have tubes (e.g., trach tube, NG tube, Dobhoff) that may harbor bacteria that can be transferred to the lungs during prandial aspiration or with microaspiration? • Is my patient receiving mechanical ventilation?
Bolus variables	• Is my patient aspirating thickened liquids or highly acidic materials? • Is my patient frequently aspirating large volumes?

Note. GERD = gastroesophageal reflux disease; GI = gastrointestinal; ADL = activities of daily living; NG = nasogastric.

Palmer & Padilla (2022)

Monitor the Risk Over Time

- Transition from Inpatient—Home Care—Outpatient

- Most of our babies leave NICU with Home Care referrals for feeding and development
- Home care establishes a plan for 2 months and reassesses medical need to stay home bound every 2 months
- When baby is stable, they transition to OP therapies
- Monitor oral motor and feeding development across infancy through childhood

When to Refer for OP Support

- *Poor weight gain or weight loss*
- *Choking, gagging or coughing during eating/drinking*
- *Poor coordination with breast/bottle feeding*
- *Frustration (baby or parent) with breast/bottle feeding*
- *Aspiration*
- *Structural abnormalities*
- *Oral motor delays (not moving the tongue appropriately, not chewing, etc.)*
- *Inability to transition to baby food purees by 8-9 months of age*
- *Inability to accept any table food solids by 10 months of age*
- *Inability to use a sippy cup by 12 months of age*
- *G-Tube or NG-Tube feedings*
- *Aversion or avoidance of all foods in specific texture or food group*
- *Food range less than 20-30 foods*
- *Mealtime battles*
- *Meals lasting longer than 30 mins*
- *Child is difficult to feed*
- *Parental history of an eating disorder, with a child not meeting weight goals*

Video Swallow Study Criteria

- *Best practice is to complete bedside/clinical swallow evaluation first*
  - *Make sure to refer to medical based therapy if concerns*
  - *Trial strategies first: position changes, flow rates, oral motor supports, pacing*
- *Babies need to be term (38wks or older)*
  - *Unless has known structural abnormality, like TEF*

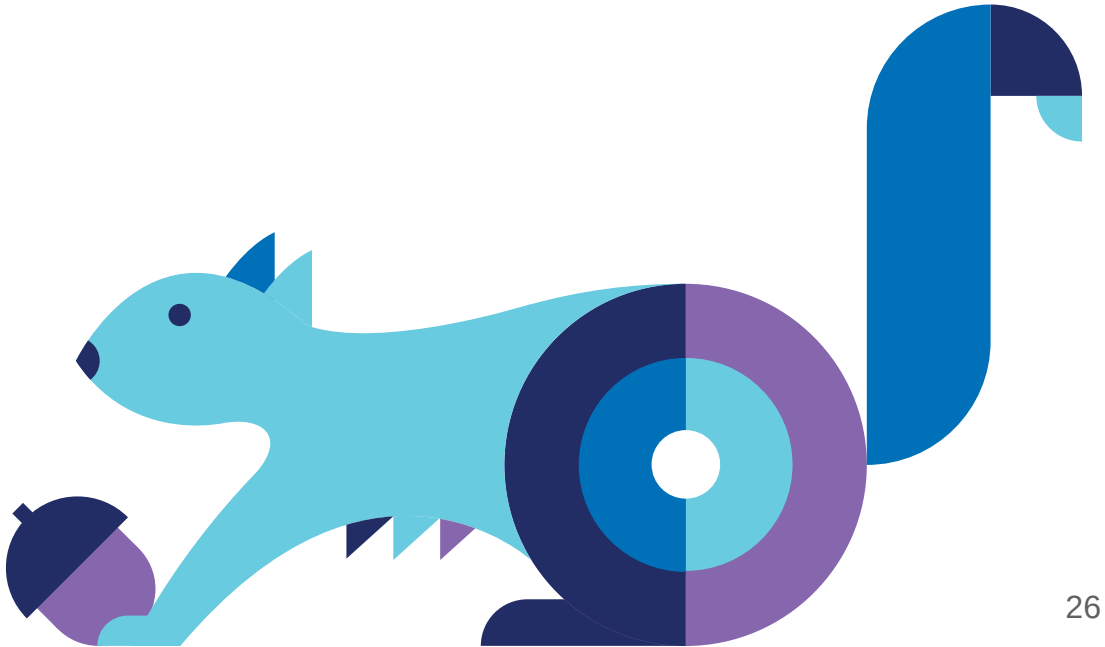
- *Remember, VFSS is NOT PASS/FAIL, it guides safety and interventions*
- *Our goal is to help the patient feed safely, even small amounts to keep practicing*

Follow Up After VFSS

- Frequently have gaps to obtain thickener
  - ✓ *Waiting for script*
  - ✓ *Waiting for insurance approval*
  - ✓ *Not all insurances cover thickener*
  - ✓ *Access issues between pharmacy and DME*
- Feeding therapy
  - ✓ *Teach recipe*
  - ✓ *Teach flow testing (IDDSI)*
  - ✓ *Ensure flow rate is appropriate*
  - ✓ *Help families problem solve*

Common Diagnoses Referred for OP VFSS

- Laryngomalacia
- Chronic cough
- Chronic vomiting
- Asthma (under 2 years of age)
- Failure to Thrive
- Global coordination deficits
- Neurological impairments
- Coughing/choking
- Feeling that food “gets stuck”
- Former preemies



Quality Improvement Measures

- *Triaging systems*
- *In basket messaging*
- *Education meetings for Feeding team*
- *Presentations to RNs, MDs, community providers, RDs, GI team*
- *Competencies to improve quality of care*
- *Weekly Feeding Rounds in NICU*
- *Developing algorithms for advancing PO intake and for determining individual risk factors*
- *Discharge planning rounds between IP and HC to support transition home with poor feeding/tube supports*
- *Developing screening tools*
- *Start QI projects*

Aspiration Screener Data

- *Our team conducted our own review to try to show need for aspiration screener upon admission to hospital*
- *2 Feeding Therapists used PEDI-Eat 10 to screen all newly admitted pts across a few days, total 33 screens completed*
- *17 positive screens (parent concerns), 16 negative (no concerns)*
    - *6 had received Feeding Therapy consult with admission intake*
    - *4 did not have acute care feeding needs*
    - *7 were potential misses for acute care feeding referral*

Positive Screened Patients (Non-acute stage)

- 4/17 patients screen positive needed referral to non–acute feeding therapy.
  - Patients had varying clinical situations (NPO status, developmental challenges, or had sensory challenges)

- SLP/OT provided recommendations (choosing softer foods, cutting food smaller, using liquids to help clear pharynx, positioning strategies, and referral recommendations) for these patients in a non-acute stage.

Missed Opportunities

- 7 patients tested positive but didn't receive consult.

Outcomes for those patients who were missed:

- 3/7 (43%) readmitted to hospital and had continued feeding concerns
- 1/7 (14%) continued to have feeding difficulties
- 2/7 - post op T&A cases – child had challenges eating before and after surgery
- 1/7 was a child with complex medical diagnosis.

(Note: one of the readmitted children also fell into the category of complex medical diagnosis that was diagnosed after readmission)

*continuing to see missed opportunities of pt's readmitted with feeding difficulties

Rationale	Readmitted	Complex medical dx	Continued feeding difficulty	T/A
# of Patients	3*	2*	1	2

Shows the need for improved screening

- Primary Care Physicians
- ENTs
- Pulmonologists
- Cardiologists
- Gastroenterologists
- Any Hospital Admission

Getting the right care at the right time

Published Screening Tools

Neonatal Assessment Tool:
https://www.infantfeedingcare.com/neoeat

Infant Eating Assessment Tool:
https://www.infantfeedingcare.com/infanteat

Pediatric Eating Assessment Tool:
https://www.infantfeedingcare.com/pedieat

other screening tools for GERD, feeding impact, and family management
https://www.infantfeedingcare.com/othertools

Preposed Next Steps

- **Aerodigestive clinic**
- **Increased collaboration meetings**
- **Shared smart text in notes so that all providers who see pt have discussion about safety (PCP, GI, ENT, Pulm, RDs, Cardiology, Feeding team)**

Detailed Feeding Screening

- Does your child have difficulty eating/drinking?
- Current Diet:
    - Liquids (thin, slightly, mildly, ½ moderately, moderately, no liquids)
        - if on thickened liquids: which thickening agent using: (Gelmix, Simply Thick, Thick-N-Easy/Thick-It, Purathick, oat cereal, whole food, baby food, other:); recipe: __
        - amount consumed in one sitting/daily
    - Solids (regular, easy to chew, IDDSI 6: soft and bite sized, IDDSI 5: minced and moist, IDDSI 4: pureed, no solids by mouth)
- Tolerance to diet/Concerns: (no concerns, tolerating well, coughing, difficulty stooling, refusals, less intake, weight loss, weight gain, too much stooling, other:)
- How long do meals/feeds take:
- Spitting up/emesis:
- Stooling:
- Weight/Growth:
- Admissions/illnesses

Take Aways

- When in doubt, refer out to Dysphagia Based Feeding Therapy
  - Closely monitor s/sx of aspiration, and refer early
    - Especially for higher risk populations
- VFSS is NOT just Pass/Fail
- Once feeding plan in place, more closely monitor these patients
  - Hydration, nutrition, stooling, weight/growth
  - Family stress, supplies

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Thank You!