1

2

Objectives

This session will enable the learner to:

- Understand why the FEWS tool was developed and its intended role in patient care
- Utilize an objective tool for early identification of medically complex pediatric patients at risk for clinical deterioration
- Apply a standardized escalation pathway to communicate clinical concerns to the care team and decrease the transfer of patients to a higher level of care

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Who we are: Franciscan Children's

Since 1949, Franciscan Children's (FC) has served children and adolescents with complex medical, mental health, and special education needs. **We are the only pediatric post-acute provider in New England that cares for children on ventilators**. Provide compassionate, individualized, family-focused care.

- Only pediatric aquatic therapy in the region
- Onsite consultations with experts from Boston Children's
- Extensive parent/caregiver training

Since 2023, we are a proud affiliate of Boston Children's Hospital.

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Inpatient Medical Unit Programs

Complex medical conditions including prematurity, genetic syndromes, and rehabilitation after severe illness or injury

- Acute rehabilitation (brain/spinal cord injury, seizure disorder, neuromuscular disorders)
- Complex medical rehabilitation, including feeding program
- Pulmonary rehabilitation (tracheomalacia, bronchopulmonary dysplasia, chronic lung)

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Inpatient Medical Units

48 inpatient medical beds

24-hour care model (MD, RN & RT), primary NP model

Limitations in resources

- Pharmacy, lab, x-ray not available 24 hours per day
- No emergency room or in-house specialists
- Cannot utilize standard BLS ambulance transport for the majority of our patient population, need to use acute transport teams

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Background & Purpose

Background: Clinical decompensation in medically complex pediatric patients at a post-acute care facility often results in the transfer of the patient to a higher level of care. Historically, patient surveillance relied on subjective assessments leading to variations in communication and care escalation.

Purpose: To identify and respond to early signs of clinical decompensation in medically complex pediatric patients using an objective and standardized method.

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Key stakeholders

- Nursing
- Respiratory Therapy
- Medical provider team
- Quality & Safety
- Information Technology

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Methods: PDSA Model

Quality improvement framework that repeats the cycle to refine improvements before full implementation

Iterative process: the completion of 1 cycle leads directly into the start of the next cycle

Most changes require many PDSA cycles

Reflect on results at every change

9

Preliminary research

Analyzed trends in reasons for unplanned urgent transfers from FC to acute care facilities

Evaluated multiple tools designed to identify pediatric patients at risk for clinical deterioration

Most pre-existing tools did not capture the medically complex patient population at FC

Most were typically used in high-resource settings

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Development of scoring tool

Drafted first version of FC-specific scoring tool in Fall 2023, heavily influenced by other pre-existing scoring tools

Trained a small pool of nurses how to score patients using the scoring tool

Trialed in October 2023 on 2-3 patients on each unit; scored every 4 hours at 8/12/4 AM & PM, total score out of 15

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Scoring tool, Version 1

	0	1	2	3
RESPIRATORY	• Baseline respiratory status • Baseline vent settings & fiO2 • No PRNs • Tolerating vent wean • Baseline CPT/suction needs	• 10% increase in fiO2 need • PRNS q4-6hrs • Ending wean early • Mild tachypnea • Mild increased WOB (nasal flaring, retracting) • CPT/suction q3-4hr	• 20% increase in fiO2 need • PRNs q2-4hrs • Change to 1 vent setting • Moderate tachypnea • Moderate increased WOB (flaring, retracting, grunting, use of accessory muscles) • CPT/suction q2-3hrs	• ≥30% increase in fiO2 • PRNs q1hr • Change to 2 or more vent settings • Severe Tachypnea • Severe increased WOB (head bobbing, paradoxical breathing) • CPT/suction q1hr
NEURO	• Baseline status • Playing or sleeping appropriately	• Mild increase/decrease in neuro status • Sleepy • Irritable, but consolable • Good response to PRNs • Seizure activity, resolved with 1st PRN	• Lethargic • Irritable, difficult to console • Some response to PRNs • Seizure activity requiring more than 1 PRN	• Reduced response to pain/stimuli • Hypo/stimuli • Severe irritability • No response to PRNs • Prolonged, frequent, or uncontrolled seizure activity requiring more than 2 PRNs • New seizure activity prior hr.
CARDIOVASCULAR	• Baseline color and warmth • Baseline capillary refill • Afebrile	• Mild change HR and/or BP • Pale, capillary refill 3-4 sec • Low-grade fever • Mild hypothermia, no bair hugger needed • No need for IV access	• Moderate change HR and/or BP • Grey, capillary refill 4-5 sec • Febrile • Hypothermic requiring bair hugger <1 hr. • Possible need for IV access	• Severe change HR and/or BP • Grey and mottled, cap refill >5 sec • Febrile >40°C • Severe hypothermia requiring bair hugger >1 hr. • Needs IV access
STAFF CONCERN				
		Mild	Moderate	Severe
Vital Signs Changes Reference	Infant Toddler & Older	>10% for age >10% for age	>15% for age >25% for age	>20% for age >40% for age

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Study of data

Reliability of scoring tool was tested by reviewing clinical documentation to ensure alignment between scores and patient condition

Identified difficulty in capturing acute changes in our most complex patients due to their scores being high at baseline (for example, high PEEP strategy and >40% fiO2)

High score fatigue

Actual scoring times were inconsistent with intended scoring times

Challenges in calculating fiO2 percentage increases

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Revision of scoring tool

February 2024: Second version adjusted based on feedback & data collection

- Scoring times changed to 10/2/6 AM & PM
- Added two baseline questions: PEEP & baseline fiO2
- Adjusted calculation for FiO2 increase
- Added oxygen desaturation frequency
- Quantity of PRNs & response to PRNs; body temperature
- Eliminated vital sign changes—blended into scoring tool
- Total score out of 14

Built into EMR in March 2024

Trained all nursing staff

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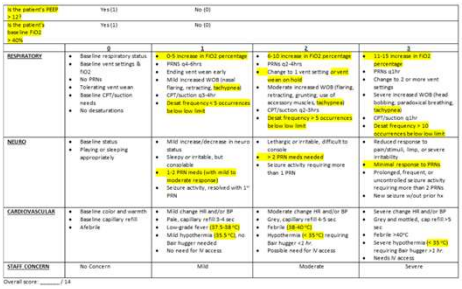
Scoring tool, Version 2



Is the patient's PEEP >12?	Yes (1)	No (0)		
Is the patient's baseline FiO2 >40%	Yes (1)	No (0)		
	0	1	2	3
RESPIRATORY	• Baseline respiratory status • Baseline vent settings & fiO2 • No PRNs • Tolerating vent wean • Baseline CPT/suction needs • No desaturations	• 0-5 increase in FiO2 percentage • PRNS q4-6hrs • Ending vent wean early • Mild increased WOB (nasal flaring, retracting, tachypnea) • CPT/suction q3-4hr • Desat frequency < 5 occurrences below low limit	• 6-10 increase in FiO2 percentage • PRNs q2-4hrs • Change to 1 vent setting or vent wean on hold • Moderate increased WOB (flaring, retracting, grunting, use of accessory muscles, tachypnea) • CPT/suction q2-3hrs • Desat frequency > 5 occurrences below low limit	• 11-15 increase in FiO2 percentage • PRNs q1hr • Change to 2 or more vent settings • Severe increased WOB (head bobbing, paradoxical breathing, tachypnea) • CPT/suction q1hr • Desat frequency > 10 occurrences below low limit
NEURO	• Baseline status • Playing or sleeping appropriately	• Mild increase/decrease in neuro status • Sleepy or irritable, but consolable • 1-2 PRN meds (with mild to moderate response)	• Lethargic or irritable, difficult to console • > 2 PRN meds needed • Seizure activity requiring more than 1 PRN	• Reduced response to pain/stimuli, limp, or severe irritability • Minimal response to PRNs • Prolonged, frequent, or uncontrolled seizure activity requiring more than 2 PRNs • New seizure w/out prior hx
CARDIOVASCULAR	• Baseline color and warmth • Baseline capillary refill • Afebrile	• Mild change HR and/or BP • Pale, capillary refill 3-4 sec • Low-grade fever (37.5-38 °C) • Mild hypothermia (35.5 °C), no Bair hugger needed • No need for IV access	• Moderate change HR and/or BP • Grey, capillary refill 4-5 sec • Febrile (38-40 °C) • Hypothermia (< 35 °C) requiring Bair hugger x1 hr • Possible need for IV access	• Severe change HR and/or BP • Grey and mottled, cap refill >5 sec • Febrile >40°C • Severe hypothermia (< 35 °C) requiring Bair hugger >2 hr • Needs IV access
STAFF CONCERN	No Concern	Mild	Moderate	Severe

Overall score _____/ 14

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Study of data

Clinical documentation consistent between scores and patient condition

Scores accurately identified acute clinical decompensation

Less fatigue of high scores

Next steps: *How do we translate score results into actionable interventions?*

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Development of escalation pathway

Data analysis of scores influenced development of the escalation pathway

April 2024: development of escalation pathway

- Green, yellow, red zone
- Escalation plan
- Actions to consider

Trialed on a handful of patients to ensure acute clinical changes were being escalated & managed in a timely and consistent manner

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Escalation pathway, Version 1

Total Score (out of 14)	Escalation Plan	Action to Consider
0-3	• Bedside RN notifies Charge RN & Charge RT to assess patient	• Discuss if there is a need to change POC or continue with current POC • Consider escalation to LIP • Continue FEWS assessment Q4H
4-8	• Bedside RN notifies Charge RN and LIP about change in status • Call Acuity Huddle • LIP/attending MD assess patient with bedside RN, Charge RN & Charge RT (within 30 minutes of notification)	• Acuity huddle • Consider work-up (i.e. labs, CXR, UA/UCx, viral panel...) • Increase frequency of vital signs & FEWS assessment Q2H • Create contingency plan
>8	• Bedside RN notifies Charge RN and LIP • Consider code PURPLE • Charge RN notifies acuity huddle team, LIP & attending MD assess patient (within 15 minutes of notification)	• Consider reduction of RN assignment (i.e. 1:1 ratio) • Increase frequency of vital signs & FEWS assessment Q1H • Consider transfer to a higher level of care

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Study of data

Quickly identified that one score of 3 was causing too many acuity huddles leading to fatigue

Example: One shift we had 5 acuity huddles for scores of 3 for momentary acute changes that were able to be treated with already prescribed PRNs.

Recognized a decrease in response times to acuity huddles and identified we were losing buy in from the team and needed to make a change

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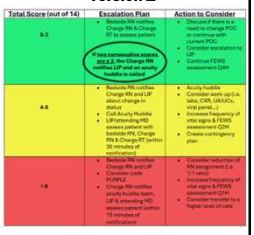
Revision of escalation pathway

May 2024

- Added acuity huddle for patients with two consecutive scores of 3
  - Identify patients who were consistently off baseline but not yet acutely sick
- Trained <u>all</u> disciplines involved in identified escalation plans
  - Nursing
  - Respiratory therapy
  - Medical provider team
  - Nursing leadership
- Full implementation across medical units

Version 2



Total Score (out of 14)	Escalation Plan	Action to Consider
0-2	• Bedside RN notifies Charge RN & Charge RT to assess patient If two consecutive scores are a 3, the Charge RN notifies LIP and an acuity huddle is called	• Discuss if there is a need to change POC or continue with current POC • Consider escalation to LIP • Continue FEWS assessment Q4H
4-8	• Bedside RN notifies Charge RN and LIP about change in status • Call Acuity Huddle • LIP/rotating MD assess patient with bedside RN, Charge RN & Charge RT (within 30 minutes of notification)	• Acuity huddle • Consider work-up (i.e. labs, CXR, UA/UCx, viral panel,...) • Increase frequency of vital signs & FEWS assessment Q2H • Create contingency plan
9-14	• Bedside RN notifies Charge RN and LIP • Consider code status • Charge RN notifies acuity huddle team, LIP & attending MD to assess patient (within 15 minutes of notification)	• Consider reduction of RN assignment (i.e. 1:1 ratio) • Increase frequency of vital signs & FEWS assessment Q1H • Consider transfer to a higher level of care

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Revision of scoring tool

August 2024: Current (third) version

- Identified categories consistently triggering increased scores for patients with clinical presentations that were managed through an established plan of care
  - Clarified criteria for fluid repletion scoring
  - Updated quantity of PRNs & included patient-specific neuro protocol into scoring
- Developed name for scoring tool: FEWS (FC Early Warning Signs)

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Current scoring tool, Version 3

Is the patient's PEEP > 12?	Yes (1)	No (0)		
Is the patient's baseline FiO2 > 40%?	Yes (1)	No (0)		
	0	1	2	3
RESPIRATORY	• Baseline respiratory status • Baseline vent settings & FiO2 • No PRNs • Tolerating vent wean • Baseline CPT/suction needs • No desaturations	• 0-5 increase in FiO2 percentage • PRNs q4-6hrs • Ending vent wean early • Mild increased WOB (retracting, tachypnea) • CPT/suction q3-4hrs • Desat frequency 1-5 occurrences below low limit	• 6-10 increase in FiO2 percentage • PRNs q2-4hrs • Change to 1 vent setting or vent wean on hold • Moderate increased WOB (retracting, use of accessory muscles, tachypnea) • CPT/suction q2-3hrs • Desat frequency > 5 occurrences below low limit	• 11-15 increase in FiO2 percentage • PRNs q1hr • Change to 2 or more vent settings • Severe increased WOB (flare, grunt, head-bobbing, paradoxical breathing, tachypnea) • CPT/suction q1hr • Desat frequency > 10 occurrences below low limit
NEURO	• Baseline status • Playing or sleeping appropriately	• Mild increase/decrease in neuro status • Sleepy or irritable, but consolable • >2 PRN meds or requires 2nd line of neuro specific protocol • Seizure activity, resolved with 1st PRN	• Lethargic or irritable, difficult to console • > 3 PRN meds or requires 3rd line of neuro specific protocol • Seizure activity requiring more than 1 PRN	• Reduced response to pain/stimuli, limp, or severe irritability • No response to PRN meds • Prolonged, frequent, or uncontrolled seizure activity requiring more than 2 PRNs • New seizure w/out prior hx
CARDIOVASCULAR	• Baseline color and warmth • Baseline capillary refill • Afebrile	• Mild change HR and/or BP • Pale, capillary refill 3-4 sec • Low-grade fever (37.5-38 °C) • Mild hypothermia (35.5 °C), no Bair hugger needed • No need for fluid repletion	• Moderate change HR and/or BP • Grey, capillary refill 4-5 sec • Febrile (38-40 °C) • Hypothermia (< 35 °C) requiring Bair hugger <2 hr • Need for fluid repletion above GI replacement orders	• Severe change HR and/or BP • Grey and mottled, cap refill >5 sec • Febrile >40 °C • Severe hypothermia (< 35 °C) requiring Bair hugger >2 hr. • Needs IV fluid repletion
STAFF CONCERN:	No Concern	Mild	Moderate	Severe

Overall score: _____ / 14

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Results

Baseline vent settings PEEP >12 and/or FiO2 above 40% increase a patient's risk for faster decompensation

Medical provider assessments & patient work-ups initiated sooner in acute illness, leading to earlier medical intervention and the ability to stabilize and manage patients at FC

2024 transfers:

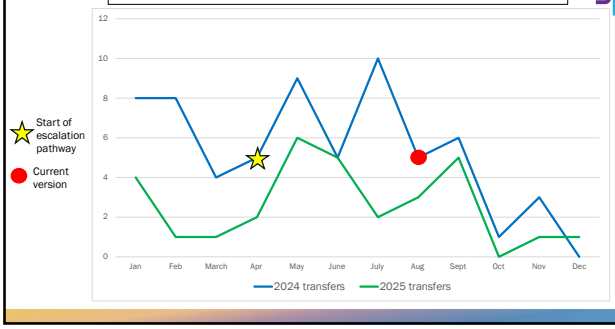
Total 64 urgent transfers, average 5.3 per month

2025 transfers:

Total 26 urgent transfers, average 2.16 per month

23

Urgent patient transfers reduced by approximately 60% from pre- to post-FEWS implementation



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Key findings

Standardized approach to clinical escalation

Provides common language to support effective communication & increased collaboration amongst disciplines

Increase in awareness of acute changes in medically complex patients; importance of patient "baseline" status

Fostering a culture that empowers nurses to confidently escalate clinical concerns without fear of judgement

Not a substitute for clinical judgement!

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Challenges & limitations

Provider readiness, change in practice

Nurse turnover

No data collection in 2023

Fluctuating census & acuity of patients

Patient-specific outliers, fatigue of high scores

26

Next steps

Sustain mode! 2026 data thus far continues to show an overall reduction in number of urgent transfers

Random chart audits for accuracy of scores & proper escalation by RN and provider

Continuous staff education, including integration into onboarding education for new staff

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How to use FEWS

1. Start with the 2 baseline questions. Ask yourself: "Does my patient have a PEEP greater than 12?" & "Is my patient's baseline oxygen requirement 40% or greater?
2. Consider your patient's respiratory baseline
3. Consider your patient's neurological baseline
4. Consider your patient's cardiovascular baseline
5. Lastly, ask yourself "Am I concerned about my patient at this moment in time?"

If the patient's current presentation falls into more than one score in a category, score the patient for the highest patient need

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Case Study

S.D. is a 5 y/o male, former 28wk preemie, with complex medical history including 4q deletion and 8q duplication, severe BPD s/p tracheostomy and ventilator dependence, SVT, grade 4 IVH with hydrocephalus, craniosynostosis, NEC with resulting short gut s/p ileostomy, GJT dependence.

Baseline: 45-50% FiO2 on Servo, PEEP 10, requires tracheal sxn q1h; intermittent fevers, sometimes neuro etiology; ostomy output fluctuates 500-650cc/24hrs

Current presentation: low grade fever 37.5°, received x1 PRN Tylenol; 24hr ostomy output 815cc, ordered for 5mL/kg Pedialyte bolus

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Is the patient's PEEP > 12?	Yes (1)	No (0)		
Is the patient's baseline FiO2 > 40%?	Yes (1)	No (0)		
	0	1	2	3
RESPIRATORY	• Baseline respiratory status • Baseline vent settings & FiO2 • No PRNs • Tolerating vent wean • Baseline CPT/suction needs • No desaturations	• 0-5 increase in FiO2 percentage • PRNs q4-6hrs • Ending vent wean early • Mild increased WOB (retracting, tachypnea) • CPT/suction q3-4hrs • Desat frequency 1-5 occurrences below low limit	• 6-10 increase in FiO2 percentage • PRNs q2-4hrs • Change to 1 vent setting or vent wean on hold • Moderate increased WOB (retracting, use of accessory muscles, tachypnea) • CPT/suction q2-3hrs • Desat frequency > 5 occurrences below low limit	• 11-15 increase in FiO2 percentage • PRNs q1hr • Change to 2 or more vent settings • Severe increased WOB (flare, grunt, head bobbing, paradoxical breathing, tachypnea) • CPT/suction q1hr • Desat frequency > 10 occurrences below low limit
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STAFF CONCERN	No Concern	Mild	Moderate	Severe

Overall score: _____ / 14

4

30

Case Study

M.G. is a 11m.o. male, ex23 week preemie with severe BPD, trach/vent dependence, pulmonary HTN, and GJT dependence. Admitted for ventilator weaning, sedation weaning, and caregiver education.

Baseline: 12hr RA TM daytime, 12hr RA Evo overnight; O2 low limit 92%

Current presentation: vent wean ended early d/t tachypnea RR 90s & desats to 78% and 82% requiring ambu; continued desats when back on vent, PEEP increased by 1; irritable but consolable with comfort measures; tachycardic 160s and new onset fever 38°

31

Is the patient's PEEP > 12?	Yes (1)	No (0)		
Is the patient's baseline FiO2 > 40%?	Yes (1)	No (0)		
	0	1	2	3
RESPIRATORY	• Baseline respiratory status • Baseline vent settings & FiO2 • No PRNs • Tolerating vent wean • Baseline CPT/suction needs • No desaturations	• 0-5 increase in FiO2 percentage • PRNs q4-6hrs • Ending vent wean early • Mild increased WOB (retracting, tachypnea) • CPT/suction q3-4hrs • Desat frequency 1-5 occurrences below low limit	• 6-10 increase in FiO2 percentage • PRNs q2-4hrs • Change to 1 vent setting or vent wean on hold • Moderate increased WOB (retracting, use of accessory muscles, tachypnea) • CPT/suction q2-3hrs • Desat frequency > 5 occurrences below low limit	• 11-15 increase in FiO2 percentage • PRNs q1hr • Change to 2 or more vent settings • Severe increased WOB (flare, grunt, head bobbing, paradoxical breathing, tachypnea) • CPT/suction q1hr • Desat frequency > 10 occurrences below low limit
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STAFF CONCERN	No Concern	Mild	Moderate	Severe

Overall score: _____ / 14

7

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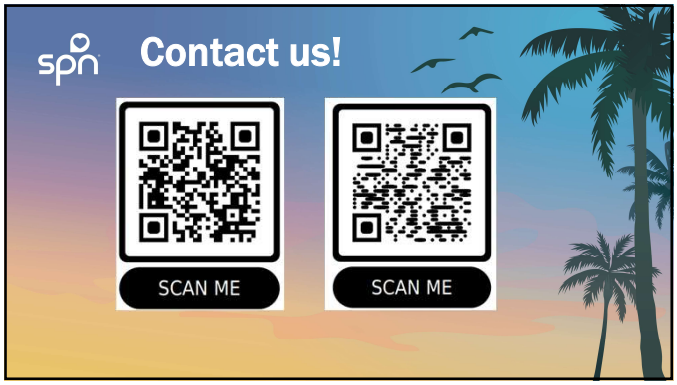

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