Supplemental Material

Model for Regional Collaboration: Successful Strategy to Implement a Pediatric Early Warning System in 36 Pediatric Oncology Centers in Latin America

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Supplemental Figure 1: Map of Proyecto EVAT Centers

Supplemental Table 1: Clinical and Implementation Outcomes Assessed by Proyecto EVAT Centers

KTA Phase	Type	Measure	Definition	Collection Method
Identify the Problem	Clinical Outcome	Clinical Deterioration Event (CDE)	An unplanned ICU transfer, use of ICU intervention (vasoactive infusion, mechanical ventilation, CPR) on the ward, or non-palliative ward death	Prospective quality improvement registry of all CDEs, including characteristics and outcomes
		Patient Volume	Monthly pediatric hematology-oncology ward admissions and non-ICU inpatient hospital days	Collected monthly from hospital census
Assess Barriers to PEWS Use	Assessment	SWOT Analysis	A center's resources along with strengths, weaknesses, opportunities, and threats to managing critical illness in children with cancer	Structured assessment conducted by the local PEWS implementation team of each center prior to implementing PEWS with feedback provided by Proyecto EVAT expert mentorship team
		Stakeholder Analysis	All clinical and operational stakeholders important to PEWS implementation along with their current support or resistance to the program	
Monitor PEWS Use	Process	Quality of PEWS Use	Correct PEWS use defined by 3 types of errors: (1) *omissions* (documented vital signs without using PEWS), (2) errors in PEWS *scoring*, and (3) PEWS *algorithm* nonadherence.	Regular (2-3x/week) review of all nursing vital signs and PEWS documentation in all currently hospitalized patients collected by the local PEWS implementation team and aggregated monthly during pilot, implementation, and sustainability phases
		Implementation Completion	High-quality PEWS use defined as less than 15% in all 3 types of PEWS use errors for at least 2 consecutive months	
	Balancing	Red PEWS	Any patient with a PEWS score of 5 or greater since the start of the PEWS pilot	Prospective registry of all red PEWS, interventions, and outcomes
Evaluate Outcomes	Impact	Staff Satisfaction	Survey of clinical staff (physician and nurses) satisfaction and comfort with PEWS use (see Supplemental Figure 4 for example)	Anonymous survey of all staff using PEWS after the PEWS pilot and as needed during implementation
		Staff Trained	Number of clinical staff (nurses, physicians) trained in using PEWS at each center	Documented by local PEWS implementation team during each PEWS training and onboarding of new staff
		External Presentations	Presentations given by local implementation leaders about PEWS outside of their institution	Collected by Proyecto EVAT leadership team through survey of all collaborating centers

Abbreviations: CPR- Cardiopulmonary Resuscitations, ICU-Intensive Care Unit, PEWS-Pediatric Early Warning System

Supplemental Figure 2. English version of PEWS (EVAT) scoring tool

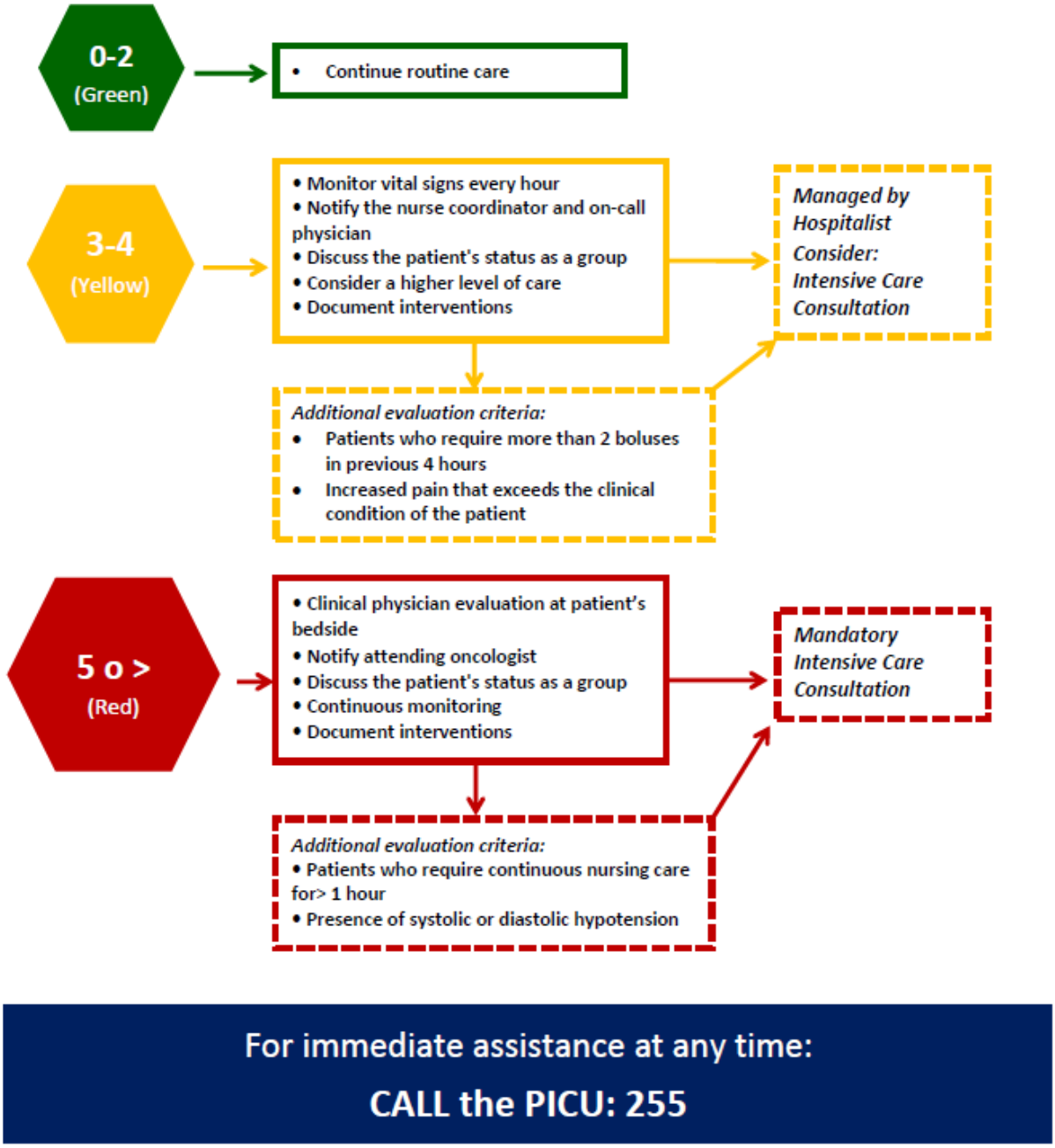
Escala de Valoración de Alerta Temprana (EVAT)					
	0	1	2	3	Result
Behavior / Neurologic	° Alert/Sleeping appropriately ° Patient is at baseline state of alertness	° Sleepy, drowsy when not stimulated ° Responds only to verbal stimuli	° Irritable, difficult to console ° Responds only to painful stimuli	° Lethargic, confused, without strength ° Unresponsive ° Seizures ° Unreactive pupils or with anisocoria	
Cardiovascular	° Appropriate skin color for patient ° Capillary refill ≤ 2 seconds ° Normal peripheral pulses	° Pale ° Vasodilated ° Capillary refill 3-4 seconds ° Mild tachycardia*	° Capillary refill 4-5 seconds ° Moderate Tachycardia* ° Diminished peripheral pulses	° Mottled ° Fill capillary> 5 seconds ° Severe tachycardia* ° Symptomatic bradycardia ° Irregular rhythm (not sinus)	
Respiratory	° Within normal parameters ° No retractions ° Normal breathing pattern ° Saturation >95%	° Mild tachypnea* ° Mild work of breathing (nasal flaring, intercostal retraction) ° Up to 1 L of oxygen via nasal cannula (NC) ° Saturation 90% -94% without oxygen	° Moderate tachypnea* ° Moderate work of breathing (nasal flaring, intercostal retraction, grunting, use of accessory muscles) ° 1-3 L of oxygen via NC ° Nebulization every 4 hrs ° Saturation 88-89% without oxygen	° Severe tachypnea* ° Respiratory rate below normal for age* ° Severe work of breathing (head-bobbing, thoraco-abdominal dissociation) ° Oxygen via facemask with reservoir (not post-sop) ° > 3 L oxygen via NC ° Nebulization > every 4 hours ° Saturation <90% with oxygen ° Apnea	
Nurse concern	Not concerned	Concerned			
Family concern	Not concerned and present	Concerned or absent			
				TOTAL	

*** Please refer to Heart Rate and Respiratory Reference Tool**

Based on Bonafide C, et al. Development of Heart and Respiratory Rate Percentile Curves for Hospitalized Children. Pediatrics 2013;131;e1150.

	Mild	Moderate	Severe
Respiratory rate and heart rate	90-95th percentile for age	95-99th percentile for age	> 99th percentile for age

Supplemental Figure 3. English version of PEWS (EVAT) sample action algorithm



Supplemental Figure 4: Sample staff PEWS satisfaction survey

Instructions:
The following survey was designed to evaluate nursing satisfaction with the implementation of EVAT. Please read the survey and answer each question honestly. The survey is anonymous. Thank you in advance for your participation.

Level of Nursing: Licensed Technician Auxiliary

Unit:_____ Years of Experience:_____

	Strongly Disagree	Disagree	Agree	Strongly Agree
I understand how to use the EVAT scoring tool and algorithm.	1	2	3	4
I use EVAT in the routine care of my patients.	1	2	3	4
EVAT helps me carry out my work better.	1	2	3	4
EVAT adequately predicts the deterioration of patients.	1	2	3	4
The training that I received is adequate for me to use EVAT.	1	2	3	4
EVAT is difficult to understand	1	2	3	4
EVAT is difficult to implement	1	2	3	4

1. Do you use EVAT with each patient? Describe why yes or why no.
2. Do you understand how to use EVAT?
3. Is EVAT a useful tool? Please, describe why yes or why no.
4. What makes EVAT difficult to use? How can we help to resolve these challenges?

Please circle the factors that you consider to be important obstacles to using EVAT frequently in your work.

	Very Significant Obstacle	Significant Obstacle	Small Obstacle	Not an obstacle
Time	1	2	3	4
Number of admissions/discharges	1	2	3	4
Nursing to Patient ratio	1	2	3	4
Availability of PEWS tools of reference or consult	1	2	3	4
Other:	1	2	3	4

5. Please write other things that affect your ability to use EVAT in daily practice.
6. I need more training to use EVAT correctly with my patients, yes or no?
7. Additional comments: