

# Bedside Pediatric Early Warning System (BPEWS)



# What is Bedside PEWS?

## Pediatric Early Warning System

- Utilizes objective data (vital signs and assessment) to identify early signs of patient deterioration
- Can predict deterioration six to eight hours prior to a code activation
- Used to eliminate preventable codes
- Bedside PEWS is not validated for use in the EDTC, PICU or NICU at this time
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# Bedside PEWS Clinical Assessment



- 7 standard parameters or assessment findings are totaled to produce the patient's total BPEWS score
- The information used for a patient's score is based off vital signs and assessment findings that you are **ALREADY** obtaining!

# BPEWS Parameters

- The 7 parameters are:

-Heart Rate

-Oxygen Requirement

-Systolic Blood Pressure

-Respiratory Effort

-Respiratory Rate

-Capillary Refill Time

-Oxygen Saturation

Research shows that these parameters are all valid measures of severity of illness!

# Using the BPEWS Scoring Tool

- The scoring tool is age-based
- Using the patient's vital signs and assessment, each parameter is assigned points
- Points are added to reach a total BPEWS score, ranging from 0 to 26
- A higher score or a **trend** of increasing scores indicates a higher risk of deterioration



Age	HR	SBP	RR	O2 Therapy	Sats	Resp Effort	CRT	Points
<b>0 up to 3 mo</b>	110-150	60-80	29-61	RA	>94%	<b>NO</b> retractions, nasal flaring, grunting, etc.	< 3 sec	<b>0</b>
	91-109 <u>or</u> 151-179	50-59 <u>or</u> 81-100	19-28 <u>or</u> 62-81		91-94%	Mild retractions <u>and/or</u> nasal flaring		<b>1</b>
	80-90 <u>or</u> 180-190	45-49 <u>or</u> 101-130	15-18 <u>or</u> 82-91	O2 <u>up to</u> 4L/min	< or = 90%	Mod. retractions <u>and/or</u> nasal flaring		<b>2</b>
	< 80 <u>or</u> > 190	< 45 <u>or</u> > 130	<15 <u>or</u> > 91	O2 > 4L/min or HFNC at any L/min		Severe retractions, head bobbing, grunting, gasping or apnea >20sec	> or = 3 sec	<b>4</b>
<b>3 mo up to 1 yr</b>	100-150	80-100	24-51	RA	>94%	<b>NO</b> retractions, nasal flaring, grunting, etc.	< 3 sec	<b>0</b>
	80-99 <u>or</u> 151-169	70-79 <u>or</u> 101-120	19-23 <u>or</u> 52-71		91-94%	Mild retractions <u>and/or</u> nasal flaring		<b>1</b>
	70-79 <u>or</u> 170-180	60-69 <u>or</u> 121-150	15-18 <u>or</u> 72-81	O2 <u>up to</u> 4L/min	< or = 90%	Mod. retractions <u>and/or</u> nasal flaring		<b>2</b>
	<70 <u>or</u> > 180	<60 <u>or</u> >150	< 15 <u>or</u> > 81	O2 > 4L/min or HFNC at any L/min		Severe retractions, head bobbing, grunting, gasping or apnea >20sec	> or = 3 sec	<b>4</b>
<b>1 yr up to 5 yr</b>	90-120	90-110	19-41	RA	>94%	<b>NO</b> retractions, nasal flaring, grunting, etc.	< 3 sec	<b>0</b>
	70-89 <u>or</u> 121-149	75-89 <u>or</u> 111-125	15-18 <u>or</u> 42-61		91-94%	Mild retractions <u>and/or</u> nasal flaring		<b>1</b>
	60-69 <u>or</u> 150-170	65-74 <u>or</u> 126-160	12-14 <u>or</u> 62-71	O2 <u>up to</u> 4L/min	< or = 90%	Mod. retractions <u>and/or</u> nasal flaring		<b>2</b>
	< 60 <u>or</u> > 170	<65 <u>or</u> >160	<12 <u>or</u> >71	O2 > 4L/min or HFNC at any L/min		Severe retractions, head bobbing, grunting, gasping or apnea >20sec	> or = 3 sec	<b>4</b>

<b>5 yr up to 12 yr</b>	70-110	90-120	19-31	RA	>94%	<b>NO</b> retractions, nasal flaring, grunting, etc.	< 3 sec	<b>0</b>
	61-69 <u>or</u> 111-129	80-89 <u>or</u> 121-140	14-18 <u>or</u> 32-41		91-94%	Mild retractions <u>and/or</u> nasal flaring		<b>1</b>
	50-60 <u>or</u> 130-150	70-79 <u>or</u> 141-170	10-13 <u>or</u> 42-51	O2 up to 4L/min	< or = 90%	Mod. retractions <u>and/or</u> nasal flaring		<b>2</b>
	<50 <u>or</u> >150	<70 <u>or</u> >170	<10 <u>or</u> >51	O2 > 4L/min or HFNC at any L/min		Severe retractions, head bobbing, grunting, gasping or apnea >20sec	> or = 3 sec	<b>4</b>
<b>12 yrs and up</b>	60-100	100-130	12-17	RA	>94%	<b>NO</b> retractions, nasal flaring, grunting, etc.	< 3 sec	<b>0</b>
	50-59 <u>or</u> 101-120	85-99 <u>or</u> 131-150	10-11 <u>or</u> 18-23		91-94%	Mild retractions <u>and/or</u> nasal flaring		<b>1</b>
	40-49 <u>or</u> 121-140	75-84 <u>or</u> 151-190	9 <u>or</u> 24-30	O2 up to 4L/min	< or = 90%	Mod. retractions <u>and/or</u> nasal flaring		<b>2</b>
	<40 <u>or</u> >140	<75 <u>or</u> >190	<9 <u>or</u> >30	O2 > 4L/min or HFNC at any L/min		Severe retractions, head bobbing, grunting, gasping or apnea >20sec	> or = 3 sec	<b>4</b>

# Calculating a BPEWS Score

You are taking care of a 9 year old patient admitted with fevers and hypoxia.  
What points will your patient obtain based on vital signs and nursing  
assessment findings?

## Vital signs and assessment:

- HR: 155
- BP: 135/78
- RR: 40
- 3 liters oxygen per nasal cannula
- POX: 91%
- Moderate intercostal retractions, with nasal flaring
- CRT less than 3 seconds





# BPEWS Scoring Tool

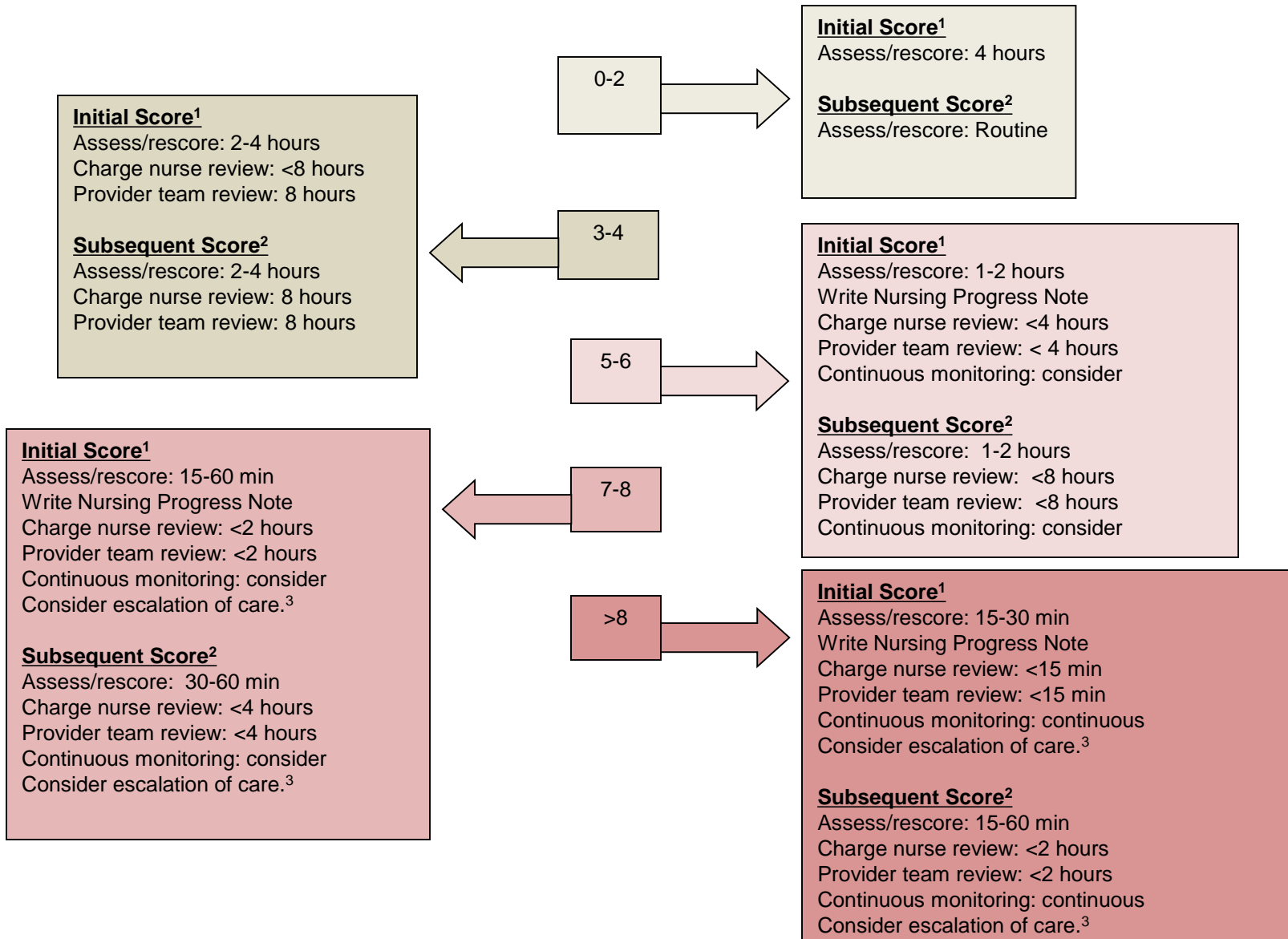
**Total PEWS score = 11**

Age	HR	SBP	RR	O2 Therapy	Sats	Resp Effort	CRT	Points
5 yr up to 12 yr	70-110	90-120	19-31	RA	>94%	NO retractions, nasal flaring, grunting, etc.	< 3 sec	0
	61-69 or 111-129	80-89 or 121-140	14-18 or 32-41		91-94%	Mild retractions and/or nasal flaring		1
	50-60 or 130-150	70-79 or 141-170	10-13 or 42-51	O2 up to 4L/min	< or = 90%	Mod. retractions and/or nasal flaring		2
	<50 or >150	<70 or >170	<10 or >51	O2 > 4L/min or HFNC at any L/min		Severe retractions, head bobbing, grunting, gasping or apnea >20sec	> or = 3 sec	4

# Using the BPEWS Care Recommendations

- **Guides** assessment frequency and other interventions based on the total BPEWS score and **trend**
  - Encourages communication and collaboration between the nurse and physician – key step!
  - Nurses/providers continue to use **clinical judgment**
- \*\*If a nurse or care provider feels that additional resources are needed at any point, they should still act based on patient needs and clinical judgment.**

## BPEWS Care Recommendations



# Care Recommendations Footnotes

**1: Initial** recommendations are intended to be applied when a patient either has their initial Bedside PEWS score calculated on admission to the unit, or when the patient's condition is changing when assessed by their recent Bedside PEWS scores.

**2: Subsequent** recommendations are intended to assist level of care decision-making for children who after review have a Bedside PEWS score remaining in the same category.

**3: Escalation of care** interventions could include the Rapid Response Team or other critical care resources. These are recommendations to be used at the discretion of bedside health care providers. They are not intended to replace clinical judgment, but rather to augment it.

## Hints for Success

- Pay close attention to how you arrange your patient interactions so that you are collecting assessment data prior to patient handling and cares
- For any diagnosis, remember to pay attention to your patient's baseline score and the **trends** of their scores
- Continue to use your clinical judgment to determine when care for your patient needs to be escalated

# Documentation Expectations

- Document a BPEWS score with VS and assessment
  - Score *at least* Q4 hrs, unless the provider has ordered VS less often (e.g. Q6 hr VS with respiratory treatments)
- Document actual HR and BP values
- If “no BP” or “no POX” document ‘UTA’
  - *If score is 4 or greater*
    - obtain a BP and POX
  - *If score 5 or greater*
    - write a nursing progress note



# Documentation: EPIC (sample)

	0300	0534	0800	0845
<b>Vital Signs</b>				
Temp (C)			38 (100.4)	37.5 (99.5)
Temp Source			Axillary	Axillary
Heart Rate			148	170
Heart Rate Source			Apical	Pulse oxim...
Cardiac Regularity			Regular	Regular
Respiratory Rate			32	80
NIBP			106/59	114/66
NIBP Mean			78	86
NIBP Location			Leg, R	Arm, R
NIBP Method			Automatic	Automatic
NIBP Cuff Size			Green	Green
Vitals Position			Held	Held
Invasive Monitoring Selection				
Observations				
<b>Thermoregulation Bed</b>				
Infant Bed - Thermoregulation				
<b>Thermoregulation Interventions</b>				
Thermoregulation Interventions				
<b>Oxygen Therapy</b>				
SpO2			96	95
SpO2 Site				
Pulse Oximetry Type			Intermittent	Intermittent
Pox Probe Site Changed?				
Additional O2/CO2 Monitoring				
Additional O2 Device			RA	RA
O2 Flow Rate (lpm)				
Additional O2 Device				
<b>BPEWS Age Category</b>				

<b>BPEWS Age Category</b>				
BPEWS Age Category				
<b>BPEWS Components (3 mos up to 1 yr)</b>				
Heart Rate (BPEWS)			0	2
Systolic BP (BPEWS)			1	1
Respiratory Rate (BPEWS)			0	2
O2 Sats (BPEWS)			0	0
O2 Therapy (BPEWS)			0	0
Respiratory Effort (BPEWS)			1	1
Capillary Refill (BPEWS)			0	0
<b>BPEWS Scores (3 mos up to 1 yr)</b>				
Partial BPEWS Score			2	6
BPEWS Total Score			2	6
<b>BPEWS - Care Recommendations Review</b>				
Review of BPEWS Total Score (0-2)				
Review of BPEWS Total Score (3-4)				
Review of BPEWS Total Score (5-6)				<a href="#">See Clini...</a>
Review of BPEWS Total Score (7-8)				
Review of BPEWS Total Score (>8)				
<b>Apnea &amp; Bradycardia</b>				
Apnea / Brady / Freq Desats				
<b>Measurements</b>				
Height				
Height / Length Source				
Height / Length Method				
Weight				

# Why use BPEWS?

- Validated, research-based tool used to predict deterioration
  - Developed at *Toronto Hospital for Sick Children*
- Literature review from outside facilities shows that score increased over 24 hours prior to PICU admit
- At CHW, a retrospective review was completed evaluating Code 7 and RRT events from 2009
  - Confirmed that Bedside PEWS can identify patients at risk **up to 11 hours** prior to unplanned transfer to PICU and well in advance of activating an RRT or Code 7





# Benefits of BPEWS

- Standardized and quantified nursing assessment
- Evaluates and tracks **patient trends** over time
  - For example, a patient with a score of a 6 who has been scoring 5-6 for days might not be as concerning as a patient scoring a 6 who has had a score of 0
- Facilitates interdisciplinary communication
  - Through common language and framework
  - Score and trend provides RN with a number to validate concerns about a patient
- Provides standardized recommendations for care

**COMMUNICATION IS KEY!!!**



# Nursing Feedback

## BPEWS:

- Pulls together multiple concerns into one number
- Objectifies how a patient “looks”
- Helps to quantify a “gut feeling”
- Gives nurses permission to “speak up” sooner than they might otherwise
- Empowers staff at the bedside to make requests for provider assessment and escalation of care

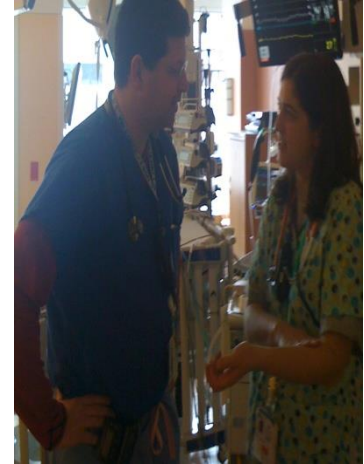
# Nursing Feedback

## Data collection shows:

- Nurses are more confident in their ability to recognize assessment findings reflective of clinical deterioration
- Nurses are more confident to act on those concerns
- Physicians are more confident in the nurse's ability to communicate concerns effectively.

# COMMUNICATION IS KEY!!!

- Communicating a patient's score:
  - Total score
  - Assessment data leading to that score
  - **Trends** in BPEWS scores
- You may need to coach/guide other providers to integrate BPEWS into communication about the patient's status (physicians, respiratory therapists, Transport, etc.)
- Remember:  
Higher PEWS score and **trend** = increased frequency of monitoring and consideration for escalation of care



# Utilizing Elements of SBARR

**SITUATION:** *What is going on with the patient?*

“I’m concerned about the 6 month old in C756, admitted this morning with respiratory distress. His BPEWS score is now 10.”

**BACKGROUND:** *What is the clinical background or context? – brief, to the point*

“Over the last 8 hours, his BPEWS scores have been steadily increasing from 5.”

**ASSESSMENT:** *What you found/think*

“His score has increased because he is now on oxygen with a HR in the 190’s and RR in the 80’s. He has also developed nasal flaring and moderate retractions.”

**RECOMMENDATION:** *What you want*

“I have the charge nurse assisting me in obtaining q15minute vitals. I also think we should activate the RRT.”

**RESPONSE:** *Receiver acknowledges information given*

(Resident) “I will page my senior and attending to let them know you’re calling an RRT, and I will come to the bedside now to assess the patient.”

# BPEWS

## Key Messages



- Simple 7 item severity of illness scoring system
- Higher scores are associated with risk for deterioration
- Quantifies **trends** in assessment findings to identify patients with increasing risk and severity of illness
  - Can predict deterioration [six to eight hours prior to a code activation](#)
- Gives the care team a common language to intervene when a patient is deteriorating

# BPEWS Case Studies

## Case Scenario #1 (Croup – no BPEWS)

Emily, a 15 month old was admitted for croup. At 1615, the nurse noted that the patient had worsening retractions and decreased UOP despite adequate PO. An IV was placed. The nurse wrote in her progress note, “resident made aware that this nurse was unable to assess accurate BPEWS score due to patient’s anxiety. Patient’s cry is also diminished at this time.” (The nurse for this patient chose not calculate BPEWS scores for the duration of her shift, starting at 0700).



At **1630** an RRT was requested due to increased work of breathing, severe subcostal and moderate intercostal retractions, increased respiratory rate, increased heart rate, and inability to assess oxygen saturation. The patient was placed on 2L O<sub>2</sub>. The charge RN calculated the patient's BPEWS score at 15.

By **1700** oxygen was increased to 10L and the patient's HR and RR increased.

	<b>1630 (RRT)</b>
<b>HR</b>	↑ 190 (4)
<b>BP</b>	134/74 (2)
<b>RR</b>	54 (1)
<b>O<sub>2</sub></b>	4L (4)
<b>Sats</b>	100% (0)
<b>Resp effort</b>	Severe ret (4)
<b>CRT</b>	<3sec (0)
<b>BPEWS</b>	<b>15</b>

	<b>1700</b>
<b>HR</b>	↑ 206 (4)
<b>BP</b>	
<b>RR</b>	60 (1)
<b>O<sub>2</sub></b>	↑ 10L (4)
<b>Sats</b>	100% (0)
<b>Resp effort</b>	Severe ret (4)
<b>CRT</b>	<3sec (0)
<b>BPEWS</b>	<b>13 (no BP)</b>

Retrospectively, the UB APN calculated the scores prior to the RRT. If the RN had been scoring the patient during her shift, she potentially would have identified the patient's deterioration earlier and could have accessed additional resources at that time. When the RRT arrived after 1630, the patient was in severe respiratory distress and was quickly transferred to the PICU.

	0800	1200	1500	1630	1700
<b>HR</b>	153 (2)	140 (1)	172 (4)	↑ 190 (4)	↑ 206 (4)
<b>BP</b>	144/86 (2)			134/74 (2)	
<b>RR</b>	44 (1)	32 (0)	48 (1)	54 (1)	60 (1)
<b>O2</b>	RA (0)	RA (0)	RA (0)	4L (4)	↑ 10L (4)
<b>Sats</b>	100% (0)	98% (0)	99% (0)	100% (0)	100% (0)
<b>Resp effort</b>	Mild ret (1)	Mild ret (1)	Severe ret (4)	Severe ret(4)	Severe ret (4)
<b>CRT</b>	<3sec (0)	<3sec (0)	<3sec (0)	<3sec (0)	<3sec (0)
<b>BPEWS</b>	6	2	9	15	13 (no BP)

↑ = Although values increased, point values have been maxed out.

**Case Scenario #2**  
**(Bronchiolitis – baseline increased score per disease process)**

Sam, a 7 month old was admitted to an acute care unit 2 days ago with bronchiolitis and +RSV. She has been on 1L O2 since admit with frequent suctioning. Her Bedside PEWS scores have been trending 3-5 since admission (which is normal for this patient population). The last BPEWS score at **0200** was 5. At **0400**, the patient's VS and assessment are:

	<b>0400</b>	
<b>HR</b>	142 (___)	
<b>BP</b>	109/41 (___)	
<b>RR</b>	54 (___)	
<b>O2</b>	1L (___)	
<b>Sats</b>	99% (___)	
<b>Resp effort</b>	Labored, mild subcostal ret (___)	
<b>CRT</b>	<3 sec (___)	
<b>BPEWS</b>	(___)	

- Should the nurse be concerned about this score in relation to the patient's overall trend?
- What interventions should the nurse consider at this time (using the Bedside Care Recommendations)?

The nurse reassesses the patient at **0600** (per the Bedside Care Recommendations for reassessment frequency). After suctioning with a large amount of secretions out, the patient's VS and assessment at **0600** are:

	<b>0400</b>	<b>0600</b>	
<b>HR</b>	142 (0)	172 (___)	
<b>BP</b>	109/41 (1)	112/48 (___)	
<b>RR</b>	54 (1)	78 (___)	
<b>O2</b>	1L (2)	3L (___)	
<b>Sats</b>	99% (0)	98% (___)	
<b>Resp effort</b>	Labored, mild subcostal ret (1)	Labored, mod. subcostal and suprasternal retractions, nasal flaring (___)	
<b>CRT</b>	<3 sec (0)	<3 sec (___)	
<b>BPEWS</b>	5	(___)	

- Should the nurse be concerned about this score in relation to the patient's overall trend?
- What interventions should the nurse **consider** at this time?

VS and assessment at **0630** are:

	<b>0400</b>	<b>0600</b>	<b>0630</b>	
<b>HR</b>	142 (0)	172 (2)	178 (___)	
<b>BP</b>	109/41 (1)	112/48 (1)	110/42 (___)	
<b>RR</b>	54 (1)	78 (2)	80 (___)	
<b>O2</b>	1L (2)	3L (2)	5L (___)	
<b>Sats</b>	99% (0)	98% (0)	98% (___)	
<b>Resp effort</b>	Labored, mild subcostal ret (1)	Labored, mod. subcostal and suprasternal retractions, nasal flaring (2)	Labored, mod. subcostal and suprasternal retractions, nasal flaring, head bobbing (___)	
<b>CRT</b>	<3 sec (0)	<3 sec (0)	<3 sec (___)	
<b>BPEWS</b>	5	9	(___)	

- Should the nurse be concerned about this score in relation to the patient's overall trend?
- What interventions should the nurse **consider** at this score?

**\*\*If the nurse had not reassessed the patient at 0600 as the Bedside Care Recommendations suggested, the patient would not have been reassessed until 0800 and the increased in the Bedside PEWS score would not have been recognized.\*\***

## Case Scenario #3

### (Sepsis – acute increase in score)

Ethan, a 5 year old boy is admitted from an outside hospital with fever of unknown origin. Admission VS and assessment are as follows (the patient is afebrile):

	2000	
HR	115 (___)	
BP	106/40 (___)	
RR	36 (___)	
O2	RA (___)	
Sats		
Resp effort	Normal (___)	
CRT	<3sec (___)	
BPEWS	(___)	



At **2200**, the patient is febrile at 40.0C. The nurse administers Tylenol.

At **2300**, the patient's temperature has returned to the normal range.

At **2400**, the patient is afebrile. VS and assessment are:

	<b>2000</b>	<b>2400</b>	
<b>HR</b>	115 (0)	174 (___)	
<b>BP</b>	106/40 (0)	130/82 (___)	
<b>RR</b>	36 (0)	44 (___)	
<b>O2</b>	RA (0)	RA (___)	
<b>Sats</b>			
<b>Resp effort</b>	Normal (0)	Normal (___)	
<b>CRT</b>	<3sec (0)	<3sec (___)	
<b>BPEWS</b>	<b>0</b>	(___)	

- Should the nurse be concerned about this score in relation to the patient's overall trend?
- What interventions should the nurse **consider** at this score?

	<b>2000</b>	<b>2400</b>	<b>2430</b>
<b>HR</b>	115 (0)	174 (4)	↑ 186 (4)
<b>BP</b>	106/40 (0)	130/82 (2)	134/80 (2)
<b>RR</b>	36 (0)	44 (1)	40 (1)
<b>O2</b>	RA (0)	RA (0)	RA (0)
<b>Sats</b>			99% (0)
<b>Resp effort</b>	Normal (0)	Normal (0)	Normal (0)
<b>CRT</b>	<3sec (0)	<3sec (0)	<3sec (0)
<b>BPEWS</b>	<b>0</b>	<b>7 (no POX)</b>	<b>7</b>

The patient was suspected to be septic and was transferred to the PICU.

## Case Scenario #4 (Asthma – high score on admit due to disease process/interventions)

George is a 4 year old admitted with asthma. He received a continuous albuterol treatment in the ED and was able to be transition to Q2 hour treatments before arrival to the floor. Admission VS and assessment are:

	1500	
HR	172 (___)	
BP	120/80 (___)	
RR	72 (___)	
O2	3L (___)	
Sats	100% (___)	
Resp effort	Mod ret (___)	
CRT	<3sec (___)	
BPEWS	(___)	

- Should the nurse be concerned about this score in relation to the patient's overall trend?
- What interventions should the nurse **consider** at this score?

At **1600** the patient is requiring additional O<sub>2</sub>. The resident orders a bolus (suspecting that the patient is mildly dehydrated) and RCP administers albuterol.

	<b>1500</b>	<b>1600</b>	
<b>HR</b>	172 (4)	180 (___)	
<b>BP</b>	120/80 (1)	118/76 (___)	
<b>RR</b>	72 (4)	68 (___)	
<b>O<sub>2</sub></b>	3L (2)	5L (___)	
<b>Sats</b>	100% (0)	98% (___)	
<b>Resp effort</b>	Mod ret (2)	Mod ret (___)	
<b>CRT</b>	<3sec (0)	<3sec (___)	
<b>BPEWS</b>	<b>13</b>	(___)	

The nurse reassesses the patient at **1630** after the albuterol treatment. The patient's vital signs improve.

	<b>1500</b>	<b>1600</b>	<b>1630</b>	
<b>HR</b>	172 (4)	↑ 180 (4)	165 (2)	
<b>BP</b>	120/80 (1)	118/76 (1)	112/70 (1)	
<b>RR</b>	72 (4)	68 (2)	54 (1)	
<b>O2</b>	3L (2)	5L (4)	3L (2)	
<b>Sats</b>	100% (0)	98% (0)	99% (0)	
<b>Resp effort</b>	Mod ret (2)	Mod ret (2)	Mod ret (2)	
<b>CRT</b>	<3sec (0)	<3sec (0)	<3sec (0)	
<b>BPEWS</b>	<b>13</b>	<b>13</b>	<b>8</b>	

At **1800** the patient's clinical status again changes. VS and assessment are below.

	1500	1600	1630	1800	
<b>HR</b>	172 (4)	180 (4)	165 (2)	180 (___)	
<b>BP</b>	120/80 (1)	118/76 (1)	112/70 (1)	126/80 (___)	
<b>RR</b>	72 (4)	68 (2)	54 (1)	72 (___)	
<b>O2</b>	3L (2)	5L (4)	3L (2)	6L (___)	
<b>Sats</b>	100% (0)	98% (0)	99% (0)	96% (___)	
<b>Resp effort</b>	Mod ret (2)	Mod ret (2)	Mod ret (2)	Mod ret (___)	
<b>CRT</b>	<3sec (0)	<3sec (0)	<3sec (0)	<3sec (___)	
<b>BPEWS</b>	<b>13</b>	<b>13</b>	<b>8</b>	(___)	

- Should the nurse be concerned about this score in relation to the patient's overall trend?
- What interventions should the nurse **consider** at this score?

This patient was transferred to the PICU.