



Measure Fact Sheet – The AHRQ-CMS Pediatric Quality Measures Program (PQMP)

Measure: Initial Risk Assessment for Immobility-Related Pressure Ulcer Within 24 Hours of Pediatric Intensive Care Unit (PICU) Admission

Measure Developer: Pediatric Measurement Center of Excellence (PMCoE)

Numerator	Denominator	Exclusions	Data Source(s)
Number of PICU patients for whom an assessment of immobility-related pressure ulcer risk using a standardized pressure ulcer risk assessment tool was documented within 24 hours of admission.	All patients admitted to the PICU for at least 24 hours during a monthly or quarterly reporting period.	None.	Electronic health record. Paper medical record.

Measure Importance

Identification of patients at risk is a key step in preventing development of pressure ulcers in critically ill and injured children. Targeted implementation of prevention strategies cannot happen if at-risk patients have not been identified. Early assessment of risk has been shown to be important in the prevention of immobility-related pressure ulcer development.^{1,2,3,4}

A pressure ulcer assessment tool should be applied in a standardized manner for each patient admitted to the PICU and should be based on an immobility-related pressure ulcer risk assessment tool that has been validated for the majority of the institution's PICU patients. Currently, the Braden Q is the only validated immobility-related pressure ulcer risk assessment tool available for use with critically ill children.⁵ Other validated risk assessment tools are acceptable if available.



Critically ill pediatric patients remain most at risk for pressure ulcer development due to their potential limitations in mobility, nutritional deficiencies, and alteration in tissue perfusion or oxygenation,⁶ in addition to physiologic instability negating the capability to reposition patients.⁷ Curley and colleagues found that patients may develop pressure ulcers as early as the first day of admission to the PICU.⁵

Pressure ulcers cause significant financial burden and human distress. The Society of Actuaries' Health Section estimated the cost of Stage I or II pressure ulcer management to be \$8,730 on average,⁸ while an adult study by Reddy and colleagues has estimated the cost of managing a single, full-thickness (Stage III, Stage IV, and Unstageable) pressure ulcer to be as high as \$70,000.⁹

Additionally, pressure ulcers potentially lead to infection, pain management challenges, disfigurement, increased length of stay, and readmission, as well as altered body image and psychological distress.^{10,11} Experts agree it is better to prevent pressure ulcers than to treat them after they have occurred.

Evidence Base for Focus of the Measure

The Guideline for Prevention and Management of Pressure Ulcers,¹² developed by the Wound, Ostomy, and Continence Nurses Society (WOCN), provides the following recommendations:

- Risk assessment should be performed upon entry to a health care setting and be repeated on a regularly scheduled basis or when there is a significant change in the individual's condition.
- Skin should be assessed and inspected regularly.
- A valid and reliable risk assessment tool should be used.

Advantages of the Measure(s)

- This measure is specified for construction in electronic health records (EHRs).
- This measure has also been specified to be constructed to assess performance through manual chart review.
- This measure fills a gap in the CHIPRA initial core set, which currently does not include any measures for the pediatric critical care unit.
- This measure is publicly available for noncommercial use.

Levels of Aggregation Applicable to the Measure

This measure is intended for aggregation and comparison at the State, regional, payment model, health plan, hospital, and practice levels.

Reliability and Validity of the Measure

Reliability testing was performed at three children's hospitals in the Chicago area in the Chicago Pediatric Quality and Safety Consortium (CPQSC). One site performed parallel-forms testing and compared the construction of this eMeasure against manual chart reviews, using a reporting period of January 1 – March 31, 2015. The other two sites conducted reliability assessment across two time periods of performance measurement as a chart review measure, for the time periods January 1 – June 30, 2015 and July 1 – December 31, 2015.

The site performing parallel-forms testing assessed this eMeasure electronically, providing electronic output for 106 unique patients representing 109 events. This same site also performed five chart reviews and compared the results of the electronic output with the results of the manual chart reviews on the same patients.

The other two sites assessed this measure as a chart review measure, providing complete chart reviews—that is, the patient met the denominator criteria—for 325 patients.

The face validity of the measure was also assessed by an Expert Technical Panel of key stakeholders and through a public comment and was determined to have both understandability and face validity for key pediatric critical care stakeholders.

Measure Development and Testing

- Feasibility testing of the eMeasure was conducted at four Chicago area hospitals, which are part of the CPQSC. A Data Element Table (DET) tool was used to assess sites' EHR systems, which included Epic and Cerner.
- At all four testing sites, each of the EHR systems had structured fields for all measure criteria and were determined to have technical feasibility. One of the sites was determined to be “feasible with workflow modifications or changes to the EHR.” In this case, while there was a structured field indicating the Braden-Q was administered, at the time of the study, the tool itself was administered on paper and not incorporated into the EHR. So, at this site, this often results in tests being administered without documentation of the event in the available structured field.
- The measure had implementation feasibility at three of the sites.
- Reliability assessments were conducted at the three sites in which the measure was considered feasible. At one site, the measure was implemented in the EHR using an electronic algorithm. Manual chart abstraction was then compared to the automated report of the constructed measure to determine the reliability of the overall measure and individual measure elements.
- At the remaining two sites, the reliability assessment of this measure as a chart review measure was conducted across two time periods of performance assessment: January 1 – June 30, 2015 and July 1 – December 31, 2015. Using an electronic algorithm, charts were identified that met the denominator criteria. These charts were stratified by age group (0 - < 6 years, 6 - < 12 years, 12 - < 18 years) and were randomly selected for abstraction within each age stratum.

Selected Results from Tests of the Measure

- Overall (N=106), for this eMeasure, clinical performance was fairly high, with 94 percent of patients meeting the measure.
- Across all three sites (N=330), the clinical performance for this chart review measure was high, with 98 percent of patients meeting the measure.

- In parallel-forms reliability testing of the eMeasure, agreement was 100 percent for measure elements: admission date, race, ethnicity, payer, and whether a pressure ulcer risk assessment was performed within 24 hours of admission. Agreement was also 100 percent for overall clinical performance of the measure.
- In parallel-forms reliability testing of the chart review measure, the clinical performance was comparable across two time periods of performance measurement (N1 = 216, N2 = 109), with 99 percent of patients who received a pressure ulcer risk assessment between January 1 – June 30, 2015 meeting the measure, as compared to 97 percent of patients who received the assessment between July 1 – December 31, 2015. This difference was not statistically significant (p=0.41).
- Feasibility testing indicated that in hospitals that currently administer the Braden-Q on paper, implementation feasibility would be greatly enhanced by developing an integrated tool that would allow consistent capture of this data element.

Caveats

- Use of the eMeasure is limited to sites documenting relevant clinical information in structured, queryable fields available in the EHRs and with all of the measure elements documented in structured fields.
- There is a possibility that missing data or ambiguous information from poor documentation of care could lead to calculation errors and low performance on the measure.
- Workflow modifications or changes to the site's EHR system may be necessary in order to calculate the measure.
- Prevention and care for pressure ulcers is an important aspect of PICU care, and this measure is the first in what we recommend to be a family of measures.

More Information

- AHRQ: CHIPRAqualitymeasures@ahrq.hhs.gov
- COE: Lisa Krams, lkrams@aap.org and Ramesh Sachdeva, rsachdeva@chw.org
- Coming soon: Link to measure details on AHRQ Web site.

For more information about the PQMP, visit www.ahrq.gov/chipra.

Notes

¹Brandeis GH, Berlowita DR, Katz P. (2001). Are pressure ulcers preventable? A survey of experts. *Adv Skin Wound Care* 2001; 14(5):244-8.

²Butler CT. Pediatric skin care: Guidelines for assessment, prevention, and treatment. *Pediatr Nurs* 2006; 32(5):443-50, 452-4.

³Quigley SM, Curley MA. Skin integrity in the pediatric population: Preventing and managing pressure ulcers. *J Spec Pediatr Nurs* 1996; 1(1):7-18.

⁴Sims A, McDonald R. An overview of paediatric pressure care. *J Tissue Viability* 2003; 13:144-8.

⁵Curley, MA, Razmus IS, Roberts KE, et al. Predicting pressure ulcer risk in pediatric patients. *Nurs Res* 2003; 52(1):22-31.

⁶Gray M. Which pressure ulcer risk scales are valid and reliable in a pediatric population? *J Wound Ostomy Continence Nurs* 2004; 31:157-60.

⁷McCord S, McElvain V, Sachdeva R, et al. Risk factors associated with pressure ulcers in the pediatric intensive care unit. *J Wound Ostomy Continence Nurs* 2004; 31(4):179-83.

⁸Shreve J, Van Den Bos J, Gray T, et al. The economic measurement of medical errors. Prepared by Milliman, Inc, for The Society of Actuaries' Health Section; June 2010. Available at <https://www.soa.org/research/research-projects/health/research-econ-measurement.aspx>. Accessed March 24, 2016.

⁹Reddy M, Gill SS, Rochon PA. Preventing pressure ulcers: A systematic review. *JAMA* 2006; 296:974-84.

¹⁰Galvin PA, Curley MA. The Braden Q+P: A Pediatric Perioperative Pressure Ulcer Risk Assessment and Intervention Tool. *AORN J* 2012; 96(3):261-70.

¹¹Baharestani MM, Ratliff CR. Pressure ulcers in neonates and children: An NPUAP white paper. *Adv Skin Wound Care* 2007; 20(4):208-20.

¹²Guideline for prevention and management of pressure ulcers. Clinical practice guideline no. 2. Mount Laurel, NJ: Wound, Ostomy, and Continence Nurses Society (WOCN); 2010 Jun 1.

The Children's Health Insurance Program Reauthorization Act (CHIPRA) called for establishment of a Pediatric Quality Measures Program (PQMP) as a followup to identifying the initial core set of children's health care quality measures. This measure fact sheet was produced by the Agency for Healthcare Research and Quality, based on information provided by the AHRQ-CMS CHIPRA Pediatric Measurement Center of Excellence (PMCoE), which was funded by an AHRQ-CMS award. A listing of all submitted CHIPRA Centers of Excellence measures can be found at www.ahrq.gov/CHIPRA. All measures are publicly available for noncommercial use.



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