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Enhancing Pain Assessment in Pediatric Sickle Cell Disease by Applying Quality Improvement Science

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Abstract

Objective: Standardized pain assessment and interventions are recommended for youth hospitalized for pain. This quality improvement (QI) project integrated into a pediatric psychology service aimed to increase the standardized assessment of pain-related functional ability for youth with sickle cell disease (SCD) hospitalized for pain.

Methods: Children and adolescents (n=102) with SCD referred for psychology consultation for poor coping in response to pain during hospitalization completed a validated self-report of functional ability in addition to pain intensity during inpatient psychology visits. At the time of the quality initiative, routine and standardized assessment of pain-related functional ability was not integrated into standard clinical care. Plan, Do, Study, Act (PDSA) cycles determined the feasibility and addressed common barriers of routine assessment and documentation of pain-related functional ability among youth with SCD during inpatient psychology visits with the primary goal to increase assessment of functional ability to at least 85% among patients with SCD referred for pediatric psychology consultation to address pain management within 1 year.

Results: Through iterative PDSA cycles, routine assessment of pain-related functional ability during psychology visits increased to an average of 93% over the course of 12 months. Routine standardized assessment of functional ability was considered feasible within a pediatric psychology service.

Conclusions/Lessons Learned: This project supported the feasibility of integrating standardized assessment of functional ability to enhance pain assessment for youth hospitalized...
for SCD pain as part of routine clinical care in a multidisciplinary setting regardless of psychology referral.

**Keywords**
functional ability; pain assessment; quality improvement; sickle cell disease; hospitalization

For youth experiencing acute pain, optimal pain assessment is the underlying foundation for effective pain management. The goals of pain assessment are to observe and quantify pain status over time in order to inform the delivery of appropriate interventions and evaluate their effectiveness (Gordon et al., 2002). Clinical guidelines for the assessment and management of acute pain recommend the use of standardized pain measures, frequent documentation of pain assessment, multidimensional assessment of pain, and appropriate intervention (Benjamin et al., 1999; Gordon, Dahl, Miaskowski, & et al., 2005). Despite improvements in pain assessment guidelines, pain remains a complex, multidimensional experience that integrates affective, emotional, and physical factors (American Academy of Pediatrics, 2001). Physical functioning and recovery of baseline functioning are critical components of evaluating acute pain among youth in hospitalized settings (McGrath et al., 2008). For example, pain assessment and response to pain management interventions are typically monitored with patient self-report and clinician observation of functioning (e.g., engagement in self-care, mobility, recreation). However, a standardized assessment of functional ability is rarely assessed along with pain intensity, thereby potentially limiting the effectiveness of pain assessment and intervention for youth hospitalized for pain. Well-validated self-report assessments of functioning, such as the Functional Disability Inventory (FDI) (Walker & Greene, 1991) and Child Activities Limitations Interview (CALI) (Palermo, Lewandowski, Long, & Burant, 2008), are commonly used in outpatient settings to assess pain and functional changes within home, school, and social environments. However, the item content (e.g., going to school, doing chores) of these assessments do not generalize well to inpatient settings. Thus, assessment measures that are sensitive to functional activities relevant to hospital admissions may help optimize inpatient pain assessment.

Adherence to standardized inpatient guidelines to promote effective pain assessment is particularly relevant when treating youth hospitalized for sickle cell disease (SCD) pain. Given the recurrent presentation of vaso-occlusive pain in pediatric SCD, patients often require intensive healthcare intervention (e.g., emergency department visits, hospital admissions) to achieve symptom stabilization and recovery to baseline functioning (Brousseau, Owens, Mosso, Paneinto, & Steiner, 2010; Raphael et al., 2009; Shankar et al., 2005). Dramatic rates of acute care utilization and rehospitalization (Brousseau et al., 2010) suggest that more comprehensive means of pain assessment are needed for young persons with SCD to improve care and support recovery to baseline functioning, including the standardized assessment of pain-related functional ability. In addition to the hallmark feature of vaso-occlusive pain, chronic pain has become increasingly common among adolescents with SCD and may be further complicated by acute on chronic pain (Dampier et al., 2017; Sil, Cohen, & Dampier, 2016). Special consideration must be given to the recovery trajectory and clinical expectations for improvement among youth managing chronic pain,
given that improvements in physical functioning tend to precede overt pain relief (Lynch-Jordan et al., 2014).

As such, the standardized assessment and documentation of functional ability at routine intervals during hospitalization may optimize pain assessment, quantify responses to medical treatment, and inform evaluation of discharge readiness. Additionally, limited pain coping and greater pain interference have been linked to longer length of hospital stay and decreased pain reduction upon discharge (Martin et al., 2018). Thus, psychological and behavioral responses to pain may also alter the course of symptom recovery and response to treatment and warrant additional consideration when evaluating pain and functional improvements during hospitalizations.

Prior to the initiation of this QI project, the guiding policy and practice of pain assessment at our home institution included routine evaluation and documentation of pain intensity and qualitative assessment of pain location, quality, and history. Although the results of physical examinations and observations of physical functioning routinely informed pain assessment and treatment planning (e.g., referrals for physical therapy), an objective assessment of physical functioning was not incorporated as a part of standard care. To address this gap, a standardized measure of functional ability was introduced and routinely administered to enhance inpatient pain assessment among youth hospitalized with SCD. This quality improvement (QI) project specifically targeted youth with SCD who were referred for psychology consultation to address poor coping in response to pain management during hospitalization, given the elevated risk for limited pain coping and response to treatment within this sample (Martin et al., 2018). This QI project represents an initial step to demonstrate the feasibility of routine inpatient functional ability assessment to inform larger-scale implementation into clinical practice. The goal of the QI project was that within 1 year at least 85% of eligible pediatric inpatients with a diagnosis of SCD who were referred for a psychology consultation for pain management would complete a standardized assessment of functional ability during every inpatient psychology encounter. The targeted goal of 85% was chosen to allow flexibility and account for system limitations that are bound to occur (e.g., technical issues) while also remaining patient-centered (e.g., patients may be too ill or tired to engage) that would limit 100% achievement.

**Method**

**Patient Population and Environment**

The Aflac Cancer and Blood Disorders Center at Children’s Healthcare of Atlanta serves over 1900 children with SCD annually at three hospital locations across the metro Atlanta area. Inpatient medical and psychological care for patients is offered at all three hospital locations totaling 54 beds. Average length of stay for patients on the hematology service is between 3–4 days. During the 12-month time period of this project, the Pediatric Psychology Inpatient Consultation-Liaison (C-L) service was comprised of four clinical psychologists, one psychology postdoctoral fellow, two masters level providers, and eight advanced psychology graduate externs.
Patients were eligible for inclusion if they presented with a medical diagnosis of SCD and were: 7 to 21 years old (due to developmental validation of the outcome measure), undergoing an inpatient hospitalization within the hematology/oncology service, referred to or followed by psychology for concerns related to poor pain coping or pain management, and English speaking. Exclusion criteria included documented cognitive impairment or delay that would interfere with survey completion. Approximately 1200 children with SCD are over 7 years of age. About 30% of patients are referred to the Psychology C-L service by a medical provider for concerns related to pain management or poor coping in response to pain, adjustment to illness or treatment, school problems, or mood changes that may occur within the context of complex or frequent pain problems.

Human Subjects Protection

This project was designed and implemented as a quality improvement project to improve current clinical care. Our Institutional Review Board’s (IRB) written policies outline details to differentiate quality improvement initiatives from research. Based on a review of this policy and discussion with an IRB representative, this project was determined to meet the requirements of a quality project. As such, IRB review and approval were not required. However, IRB approval was obtained to extract demographic data based on retrospective medical chart review.

Outcome Measurement

The primary goal for the QI project was to increase the assessment of functional ability to enhance pain assessment among at least 85% of youth with SCD referred to psychology for improved pain coping and management during hospitalizations within 1 year. A run chart was used to graph completion rates over time and is a simple yet effective tool when evaluating <15 data points to help determine whether changes made lead to improvement. Monthly review of the run chart enhanced understanding of the value of interventions implemented in real-time. Visual rules for interpretation of the run chart were utilized to help determine whether variation within the data was random or due to process improvement (Provost & Murray, 2011).

Youth Acute Pain Functional Ability Questionnaire (YAPFAQ).—Functional ability was assessed using the YAPFAQ, a 12-item self-report measure in which children and adolescents rate their level of difficulty performing a range of daily activities (e.g., getting up from bed, bathing, turning in bed) using a 5-point Likert scale (0 = Not difficult to 4 = Extremely difficult). Total scores range from 0–48, with higher scores indicating greater difficulty performing functional activities. Among youth ages 7–21 years with SCD hospitalized for vaso-occlusive pain, the YAPFAQ demonstrated strong internal reliability and test-retest reliability as well as moderate construct validity (Zempsky et al., 2014).

Pain intensity.—Patients also completed self-report of pain intensity on an 11-point numeric rating scale (NRS) ranging between 0 (no pain) to 10 (worst pain possible).

Demographic characteristics.—Age, sex, race, diagnosis, hospital campus, and admission date were gathered from the electronic medical record (EMR). Demographics,
functional ability scores, and pain intensity were entered by clinical staff into the institution’s secure, web-based data collection system, REDCap (Research Electronic Data Capture).

**PDSA Cycles and Monitoring**

PDSA (Plan, Do, Study, Act) cycles were utilized to guide conceptualization and implementation (see Figure 1) (Moen, Nolan, & Provost, 1999). Utilizing QI tools available through the Institute for Healthcare Improvement (2017), a learning structure was developed to identify key drivers that contribute directly to achieving the primary aim and interventions associated with each key driver (Figure 2). Five key drivers were identified to achieve the primary aim: identification and standardization of functional ability assessment; systematic data collection; access to information; ease of recording information; and sharing information with the medical team. Use of information in clinical-decision making was also an important factor to support long-term maintenance. However, the interventions to adequately address this driver were determined to be beyond the scope of the current project and better targeted in a separate project once our primary aim was achieved.

Four PDSAs were designed to: (1) test the feasibility of regular assessment of functional ability during psychology C-L visits at one hospital campus, (2) evaluate the feasibility of expanding functional ability assessment to two of three campuses and design a consistent method of documenting pain and functional ability assessment in psychology notes, (3) evaluate the feasibility of QI implementation at all three campuses and address common barriers to routine assessment of functional ability, and (4) design a consistent method to administer and document functional ability scores in the electronic medical record (EMR). Qualitative feedback from psychology providers along with progress towards achieving the targeted goal were reviewed during monthly team meetings to problem-solve identified barriers. Progression into a new PDSA cycle was determined based on evaluation of progress towards achieving the goal of 85% completion of assessments by eligible patients as well as feedback from clinicians that either persistent barriers interfered with implementation or interventions to support the QI aim were consistently implemented. Clinicians collectively discussed and identified interventions that addressed key drivers to implement in subsequent PDSA cycles. Personal reminders from the process owner were provided to individual psychology providers, as needed.

**PDSA Cycle 1.—**Preparation for the first PDSA cycle required identification of a validated measure of functioning for an inpatient setting (see Outcome Measurement) and operationalization of systematic data collection. Several considerations influenced the final decision to collect data at every psychology visit. First, it was unclear when to expect changes in functional ability and recovery to occur over the course of inpatient hospitalizations. Additionally, the burden of recalling complex assessment schedules (e.g., day of admission, mid-admission, day of discharge) was not a realistic solution for clinical practice given the difficulty in anticipating a patient’s length of stay. Therefore, routine collection of functional ability at each psychology C-L visit was deemed feasible as part of usual clinical care. To support provider access to information, laminated hard copies of the YAPFAQ were generated to ease patient use and administration. An existing patient log used
to track psychology’s clinical productivity was updated with a single prompt to indicate whether pain was the primary referral problem (Y/N). Psychology providers were trained in the use of REDCap for ease of recording data.

The objective of the first PDSA cycle was to test the feasibility and acceptability of functional ability assessment in clinical practice. The first PDSA cycle involved 2 psychologists at one hospital campus who assessed functional ability and pain intensity for every eligible patient with SCD referred to psychology for pain management at every psychology visit during the patient’s hospitalization. At the end of the cycle, each participating psychologist provided written and verbal feedback regarding the PDSA in terms of helpfulness, ease of administration, suggestions for improvement, and spontaneous patient feedback. The primary barrier related to feasibility was clinician forgetfulness. Environmental factors such as misplacing the laminated hardcopy of the YAPFAQ and REDCap data entry and electronic scoring issues were identified.

**PDSA Cycle 2.**—The second PDSA cycle primarily targeted access to and ease of recording information and sharing information with the medical team. Guided by psychology team meeting discussions, interventions implemented to address barriers from the previous cycle included: (a) widespread electronic and hard copy distribution of the YAPFAQ, (b) refinements in REDCap training and data entry, and (c) amending the template of psychology notes to include the functional ability total score and pain intensity rating. To support provider provision of feedback regarding the QI process, the existing patient log was expanded to document common barriers to administration.

This cycle included 4 psychologists assessing functional ability among eligible patients at two hospital campuses. During team meetings and individual feedback with referring providers regarding each patient’s psychology consultation, medical team members were informed of the patient’s functioning score and its interpretation as part of psychology’s impressions and recommendations for patient care (sharing information with team). Medical providers also were educated on where to locate the patient’s functioning scores within psychology’s clinical documentation if needed for future reference. At its conclusion, each participating psychologist provided feedback elaborating on the barriers documented in the patient log. Feedback revealed that the aforementioned barriers were satisfactorily addressed, and psychologists expressed difficulty remembering the inclusion/exclusion criteria. Patients occasionally had questions on how to answer certain items (e.g., washing hair if they did not engage in the activity) and asked psychologists why the assessment was being conducted. In response, psychology providers identified the need for guidance on how to address patients’ questions about items and a uniform method of introducing the rationale for functional ability assessment.

**PDSA Cycle 3.**—Several changes were implemented in a third PDSA to address the identified barriers related to clinician access to information. In response to clinicians’ request and feedback, a Frequently Asked Questions (FAQ) information sheet designed for psychology providers was distributed and included information on inclusion/exclusion criteria and guidance on how to respond to patient’s questions about items. Second, a clinician script was created to provide a standard explanation for functional ability
assessment with patients. In light of monthly progress approaching the targeted goal, QI implementation was expanded to include all 15 members of the psychology team at all three hospital campuses. Written and verbal feedback suggested that the primary barriers to QI administration were that the clinician completed assessment of functional ability with patients but forgot to enter data into REDCap and clinician time constraints. Although patient questions regarding how to answer items reduced with integration of a clinician script, patients occasionally declined to complete the assessment due to feeling too ill or sleepy or expressed discontent with repeated assessment.

**PDSA Cycle 4.**—The last PDSA focused on enhancing clinician and patient acceptability by planning system-wide changes related to ease of recording information and systematic data collection. Because this PDSA required system-wide changes, all 15 members of the psychology team continued through this cycle. Based on clinician feedback that integrating assessment data into the EMR would enhance workflow, the EMR was modified to facilitate recording of functional ability scores directly into the EMR rather than REDCap. A training tip sheet for entering data into the EMR was reviewed and available to all psychology providers. To support systematic data collection, clinicians were encouraged to rely on clinical judgment to evaluate whether QI administration was appropriate on a case-by-case basis to enhance patient acceptability (e.g., limit assessments when patient is sleeping).

**Results**

The Psychology C-L service conducted 605 consultations and follow-up visits (hereby referred to collectively as psychology visits) for pain management across the hematology/oncology service over the 12-month project period. A total of 194 psychology encounters did not meet inclusion criteria, primarily due to patient age. During the project period, 411 psychology inpatient visits were eligible for the QI project. Participants were 102 individual patients with average age $M=14.0$ ($SD=3.23$, range 7–19). Patients completed an average of 1.6 ($SD=0.98$, range 1–6) psychology visits during their inpatient stay, in which 61% had 1 psychology consultation ($M=2.66$, $SD=2.06$ days after admission), 26% had 2 psychology visits (second visit $M=4.62$, $SD=2.49$ days after admission), and 13% had 3 or more psychology visits (third visit $M=5.95$, $SD=2.13$ days after admission) during their hospitalization. Most patients who participated in the QI project were female ($n=56$, 55%) and African American ($n=96$, 90%), which is representative of patients with SCD admitted to our hematology service. Patients had hemoglobin type HbSS (60.4%), HbSC (27.4%), HbSB0 (5.7%), and HbSB+ (2.8%). There were no significant differences in demographic or clinical characteristics by hospital campus. However, there was a significant difference in the number of psychology visits completed per patient at each campus, $F=5.96$, $p<.01$. Specifically, Campus 1 ($M=1.55$, $SD=0.88$, range 1–5) and Campus 2 ($M=1.84$, $SD=1.11$, range 1–6) had significantly greater number of psychology follow-up visits than Campus 3 ($M=1.00$, $SD=0.0$).

**Baseline Assessment**

Baseline data were not formally collected before the onset of the QI project. However, the under-assessment of physical function and recovery was identified as a problem by
psychology staff based on clinical experience. For example, over the course of hospitalization patients presenting with pain were often observed by clinicians to improve in areas of physical function, such as self-care, mobility, and recreation, despite continued self-report of high pain intensity. A retrospective chart review was conducted to determine baseline levels of assessing functional ability for the 3-month period prior to QI implementation. Across the 3-month baseline period, the psychology C-L service conducted 41 visits for 28 unique patients with a primary referral for pain management. Standardized quantitative assessment of functional ability was not assessed during any of these visits. However, qualitative clinical documentation of functional improvements (e.g., patient participated in physical therapy, patient attended recreational activities in game room) was noted on 20–30% of visits (5–8 patients) over the 3-month baseline period.

**PDSA Cycles and Monitoring**

Data collected over 12 months are presented in a run chart (see Figure 3) and interpreted using run chart rules of visual analysis (Provost & Murray, 2011). During the 3-month baseline period, there was no quantitative assessment of functional ability for patients referred for pain management. During the first PDSA cycle, a shift on the run chart was observed as functional ability assessment increased to 64% and continued to improve. After the primary barrier of clinician forgetfulness was addressed during the 3-month duration of PDSA cycle 2, an average of 74% of all eligible patients completed assessment of functional ability and pain (range from 70–78%). A trend on the run chart was observed over the course of PDSA cycle 2 and the following 6-months of PDSA cycle 3 with the integration of a clinician script and FAQ information sheet, resulting in an average of 88.7% assessment of functional ability during psychology visits. By month 6 of the 12-month project period, psychology providers were consistently assessing and documenting functional ability of at least 85% of eligible inpatients as evidenced by a run or series of months consistently above the target goal. The primary exception to consistently meeting the QI goal occurred in month 8 when assessment rate dropped to 76%. This was primarily attributed to inclusion of adjunct psychology providers who provide infrequent coverage of the C-L service and were not systematically informed or trained in QI implementation. By the final PDSA cycle, an average of 93% of patients completed reports of functional ability to enhance inpatient pain assessment. Over the course of the QI project, less than 7% (n=7) of patients declined to participate in completing assessments.

**Discussion**

Overall, QI procedures were successfully integrated as a standard of clinical care within this inpatient psychology service, suggesting the potential utility of functional ability assessment across multidisciplinary settings and with providers at varying levels of training. In approximately one year, a team of 15 psychology providers across 3 hospital campuses systematically integrated routine assessment of functional ability among youth with SCD pain with efforts to enhance pain care through improved clinical documentation and communication of results and impressions with referring medical providers. Primary barriers affecting assessment of functional ability including clinician forgetfulness, lack of uniformity in assessment, and patient factors affecting participation (e.g., patient asleep,
expressed fatigue) were sequentially addressed over the course of PDSA cycles, resulting in an average rate of 93% completion by project end.

The integration of standardized guidelines for multidimensional pain assessment beyond pain intensity alone is feasible to enhance pain assessment among youth with SCD admitted to an inpatient medical service. Findings of this QI project support the inclusion of functional ability measures, such as the YAPFAQ, as part of an inpatient, multidimensional pain assessment. Such measures may ultimately provide meaningful data on observed treatment gains and progress towards self-care, mobility, and recreational goals. For example, psychologists often reported using specific item responses (e.g., difficulty getting out of bed) to support collaborative daily goal setting and problem-solve strategies to support patient goals. Although not directly assessed through this quality initiative, past QI projects that have included developmentally-appropriate pain intensity assessments have shown improved patient, family, and staff satisfaction with pediatric pain assessment (Treadwell, Franck, & Vichinsky, 2002). Integration of the current QI results may further advance multidimensional pain assessment and satisfaction among patients, families, and staff and offer preliminary support and evidence regarding the process and feasibility of integrating routine assessment of functional ability for all patients with SCD admitted for pain.

Valuable lessons were learned during the implementation of this QI project that will inform our future QI endeavors. In an effort to remain responsive to multiple providers and patient feedback across several hospital campuses, maintain their engagement, and address identified barriers efficiently, multiple interventions were often concurrently implemented and targeted more than one key driver. Consequently, it is difficult to identify which specific interventions may have been the most impactful in improving assessment rates. Future QI projects may benefit from balancing responsiveness to feedback with implementing a single intervention or new interventions targeting one key driver to help refine the QI process. Based on provider feedback, some of the most helpful interventions were small systematic changes that increased ease and accessibility for providers that were integrated into clinical tools and resources that were already established into routine practice. Capitalizing on habits and patterns already in place as part of clinical routines (e.g., amending clinical productivity log, note template, data collection directly in EMR) effectively addressed primary barriers of forgetfulness and ease of access experienced by clinicians. Successful implementation of the QI initiative across all hospital campuses was multifactorial, including clear and regular communication regarding QI progress, awareness and training of psychology providers at all levels, feedback regarding barriers and successes as a team, personal reminders to clinicians as needed, and developing interventions that were applicable to all campuses. Although application of the exact strategies used at our institution may not fully translate to other sites, our project illustrates how utilization of a QI approach and clinical lessons learned can help identify and address systematic barriers to begin addressing a key clinical problem. Specifically, the QI interventions were likely successful in improving assessment rates because they emerged in response to ongoing data and feedback collected through iterative PDSAs, which contrasts with traditional research in which interventions are often specified a priori and may have led to different results (Schurman, Gayes, Slosky, Hunter, & Pino, 2015).
It was anticipated that routine assessment of a standardized functional ability measure may ultimately facilitate appropriate treatment planning and aid in clinical decision-making among medical providers. Ideally, review of items and changes in scores via repeated assessments over the course of hospitalization may inform concrete behavioral targets for clinical decision-making, goal setting, and treatment planning, including the evaluation of discharge readiness. Following completion of the QI project, a SCD Advocacy Working Group was formed by nursing leadership to promote improved care of patients with SCD during hospitalizations and included interested representatives from inpatient and outpatient nursing and nurse practitioners along with physician, child life specialist, and psychologist champions to ensure broad representation across disciplines that are involved in routine care of these patients. Monthly group meetings targeted goals to promote awareness of SCD pain assessment and management, particularly among staff caring for patients with SCD during hospital admissions. One specific goal is to expand the scope of multidimensional pain assessment into routine clinical care for all patients admitted for SCD pain, regardless of psychology referral. The working group seeks to implement a plan to integrate routine assessment of functional ability in addition to pain intensity ratings into the EMR to support ongoing monitoring and maintenance of beneficial strategies identified during this QI project, facilitate ease of documentation and charting by nurse practitioners and nursing staff, and support communication with medical providers. Anticipated potential barriers, such as time constraints, were discussed during working group meetings, team meetings, and planned clinical in-services during which feasibility data collected during this QI project are highlighted.

Results from this QI initiative must be interpreted in the context of project limitations, primarily limited generalizability to patients with other medical conditions and other institutions. Our institution is home to the largest SCD population in the U.S. offering a diverse range of sociodemographics and clinical presentations that may not be representative of other programs; thus, patient feedback provided in response to this QI may not reflect patient engagement or acceptability at other sites. A formal baseline assessment was not conducted prior to the onset of the QI project, which may have informed additional QI aims or goals that were not captured by the retrospective medical chart review used to gather baseline data. Additionally, this project was initially designed and integrated into a pediatric psychology service, thereby targeting a pool of patients who demonstrated limited coping in response to pain as determined by the medical team. Although this inclusion criteria limited generalization and representativeness of the patient population, this project set the stage for implementation across the hematology service as evidenced by the expansion to the Working Group. Lastly, although reports of functional ability were routinely gathered during psychology consultations, daily assessment by the psychology consult team was not deemed feasible due to clinical demands of the C-L service that varied across sites.

Beyond the QI project, results from this initiative have highlighted the need and benefit of routine assessment of functioning for youth hospitalized for SCD pain. Results from this QI can lead to several next steps to consider. It will be important to evaluate the utility and impact of functional ability data within the context of pain assessment and recovery, such as testing the unique contribution functional ability assessment has on communications with the medical team, clinical decision-making, and multidisciplinary treatment considerations. Our
Working Group initiatives are in the process of integrating physical function assessment into nursing procedures via integration in the EMR, which may prove convenient for medical team utilization and facilitate multidisciplinary review of physical function and pain intensity during morning inpatient rounds. Moreover, functional outcomes and specific item responses may be used to guide behavioral targets for physical therapy intervention. Patients’ perceived limitations for functional ability or affective and cognitive barriers on acute pain recovery (e.g., fear of hurting) may also be explored to identify behavioral treatment targets and inform additional supportive psychological intervention (i.e., with psychology and child life services) over the course of hospitalization. Identification of potential behavioral targets can then undergo further assessment from medical and psychology clinicians to inform more comprehensive treatment plans and appropriate outpatient referrals. Overall, results showcase the application of QI methods to enhance inpatient pain assessment and offer clinical lessons that may support the integration of multidimensional assessment of pediatric pain among youth with SCD admitted for medical treatment for pain.

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Implications for Impact Statement:

This project illustrates that small systematic changes using an iterative quality improvement process can improve the assessment rates of pain-related functional ability for youth with sickle cell disease hospitalized for pain. Improved multidimensional pain assessment was feasible for clinicians to implement and for patients to complete.
Figure 1.
The Plan-Do-Study-Act (PDSA) cycle illustrating the iterative process of quality improvement
Figure 2.
Learning structure with key drivers illustrating the relationship between the overall aim and specific interventions and changes
Figure 3.
Run chart of documented functional ability assessment in youth with SCD hospitalized for pain across 15 months.