

# Implementing a Sickle Cell Pain Crisis Pathway in a Midwestern Pediatric Emergency Department: A Quality Improvement Project

McKenzie J. Falcone, BSN, RN, CPN  
Pediatric Acute Care/Primary Care DNP Candidate

Amanda Hinkel, DNP, APRN-NP, CPNP, PC/AC  
Creighton University Faculty/Advisor

## Results

### BACKGROUND / SIGNIFICANCE

- Sickle cell disease (SCD) is an autosomal recessive disorder and the most common genetic disease in the United States.
- Around 100,000 people live with sickle cell disease in the United States and 20 million worldwide, primarily African Americans.
- People living with SCD have a shorter life span, higher morbidity related to side effects, a higher burden of medical costs, and a higher loss of income related to the disease process.
- 60% of people with sickle cell disease report having one severe pain episode yearly, leading to emergency room visits or hospitalization
- Vaso-occlusive crisis can lead to unnecessary suffering, increased emergency room visits, prolonged hospitalizations, and early death compared to others without sickle cell disease

### PURPOSE

To determine the effectiveness of an evidence-based pain management clinical pathway in patients with sickle cell disease experiencing a vaso-occlusive crisis in a midwestern pediatric emergency department

### AIMS

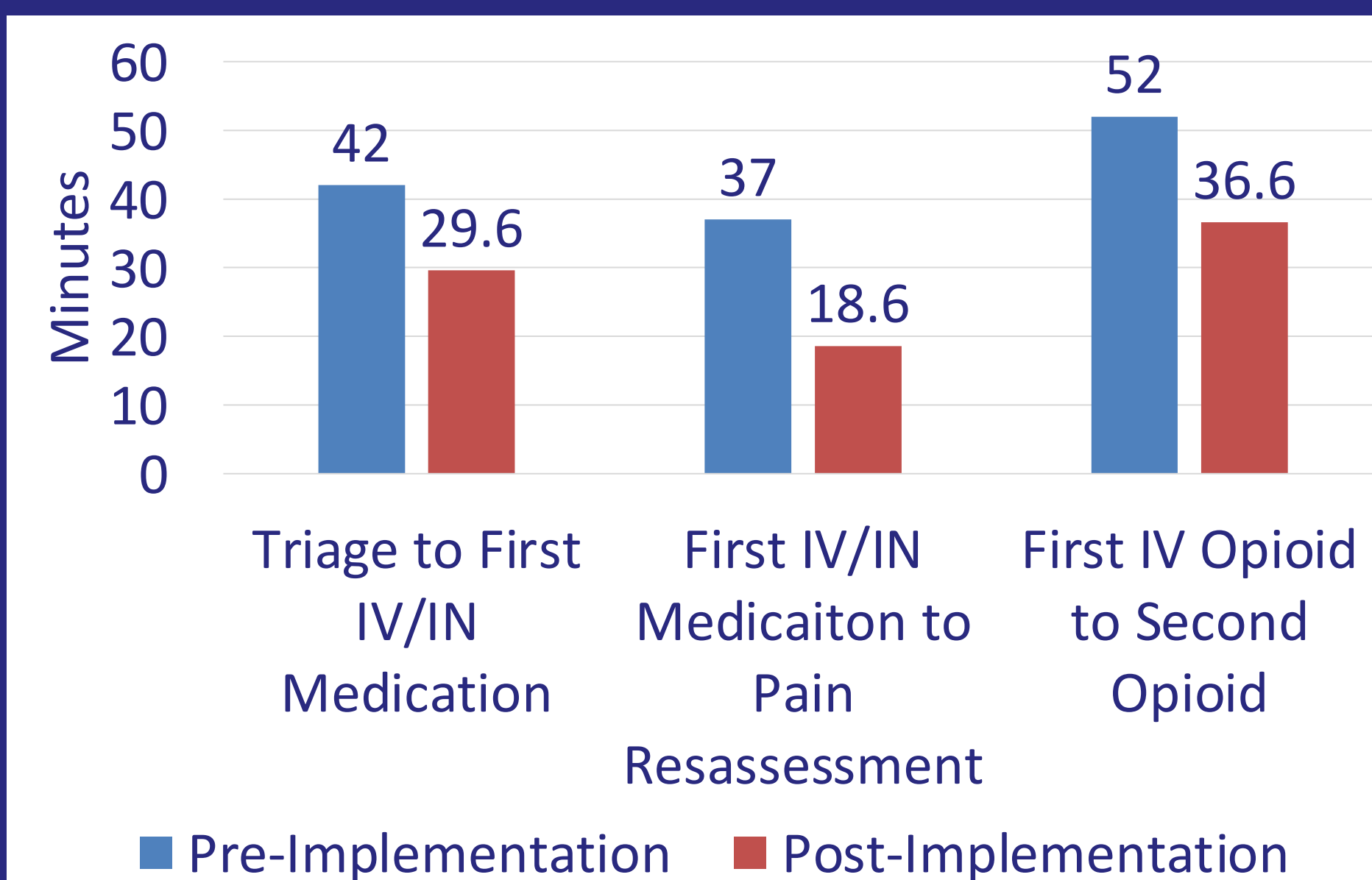
- Primary aim:**
- Utilize sickle cell pain pathway 80% of the time when a patient presents in vaso-occlusive sickle cell pain crisis
- Secondary aims:**
- Decrease the average time from arrival to triage in ED to first intravenous (IV)/intranasal (IN) pain medication to 30 minutes
  - Decrease the average time from first IV/IN pain medication to first pain reassessment to 30 minutes
  - Decrease the average time from first IV opioid to second IV opioid to 30 minutes
  - Increase the percentage of patients who receive two doses of IN fentanyl
- Balancing Metrics:**
- Monitor ED length of stay
  - Monitor the proportion of patients admitted from ED

### METHODS

- Setting:** Children's Nebraska emergency department
- Sample:** Patients with sickle cell disease who present to the emergency department in pain, 0-18 years old
- Data Collection:** Pre-Intervention: 3/1/2022 through 3/1/2023 Post-Intervention: 8/16/2023 through 11/30/2023
- Intervention:** Emergency room providers order sickle cell pain pathway when a patient presents experiencing vaso-occlusive pain crisis to standardize the care that patients receive and improve outcomes
- Data Analysis:** An independent sample t-test was conducted to compare the four pre- and post-clinical outcomes utilizing a p-value of 0.05 to determine clinical significance.

Outcome	Pre-Implementation	Post-Implementation
<b>Utilize Pathway</b> Goal: 80% (Met)	N/A	19 out of 23 (83%) patients
<b>Triage Time to First Medication</b> Goal: 30 Minutes (Met)	42 Minutes	29.6 Minutes
<b>First Medication to Pain Reassessment</b> Goal: 30 Minutes (Met)	37 Minutes	18.6 Minutes
<b>First Opioid to Second Opioid</b> Goal: 30 Minutes (Not Met)	52 Minutes	35.6 Minutes
<b>Two Doses of Fentanyl</b> Goal: Increase (Met)	17 out of 66 patients (26%)	9 out of 23 patients (39%)
<b>Length of Stay in ED</b> Balancing Metric (Decreased)	273 Minutes	215.6 Minutes
<b>Patients Admitted from ED</b> Balancing Metric (Decreased)	35 out of 66 patients (53%)	11 out of 23 patients (48%)

### Outcomes



### Demographics

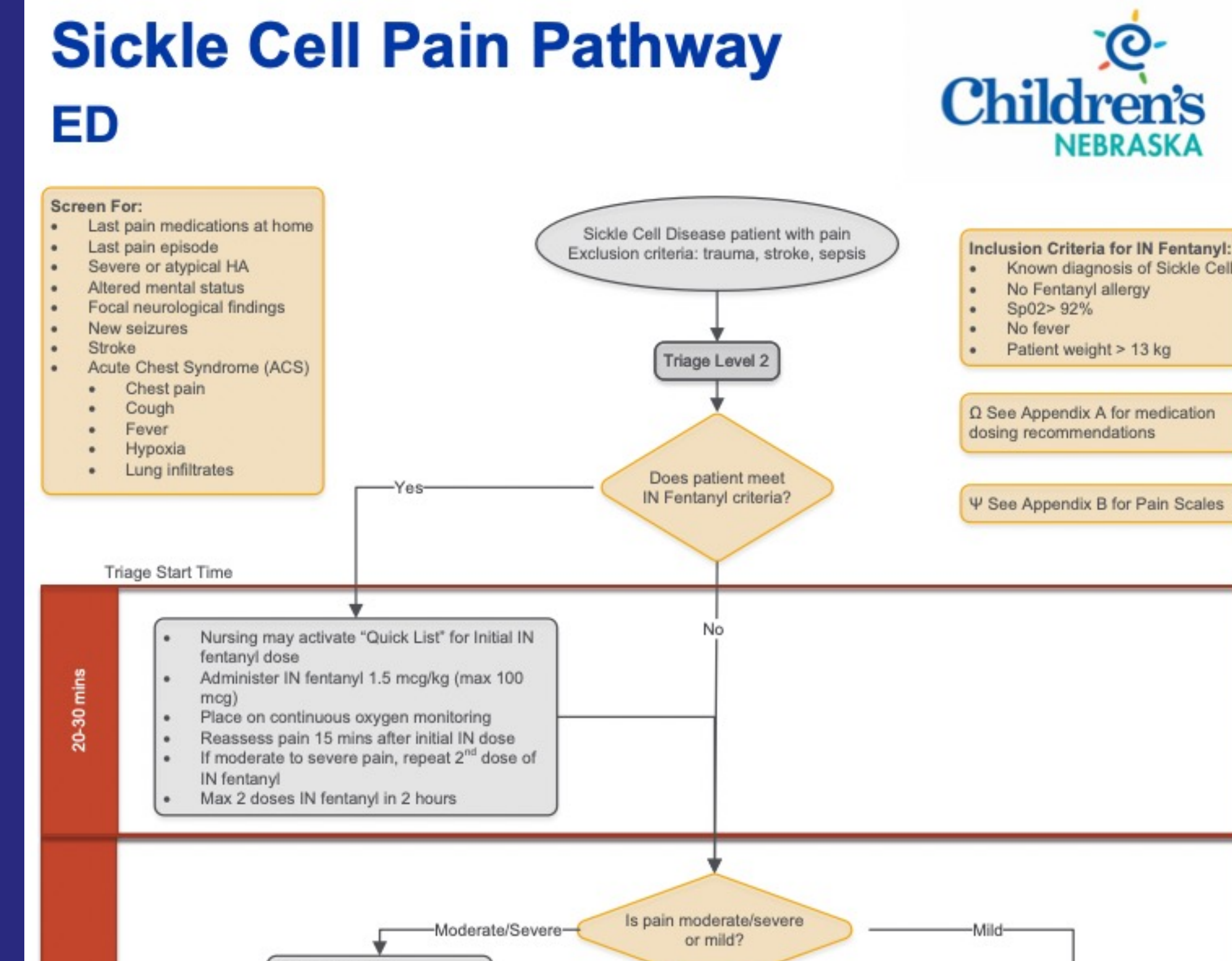
ED Patients	Pre (n=66)	Post (n=23)
<b>Gender</b>		
Male	31 (47%)	10 (43%)
Female	35 (53%)	13 (57%)
<b>Race</b>		
African American	56 (85%)	17 (74%)
Hispanic	10 (15%)	6 (26%)
<b>Age (mean in years)</b>	10.8	10.2

### T-Test

Clinical outcome	Pre (66)		Post (23)		t	p
	M	SD	M	SD		
<b>Triage to 1<sup>st</sup> IV/IN Pain Med</b>	42.38	46.239	29.57	18.86	1.85	0.034
<b>1<sup>st</sup> IN/IV med to Reassessment*</b>	36.64	32.14	18.56	8.3	3.75	<0.001
<b>1<sup>st</sup> IN/IV opioid to 2<sup>nd</sup> Opioid *</b>	52.19	45.77	35.63	22.8	1.39	0.085
<b>ED Length of Stay</b>	273	79.06	215.57	95.31	2.84	0.003

\*Missing data was excluded

An independent sample t-test was conducted to compare the four pre- and post-clinical outcomes utilizing a p-value of 0.05 to determine clinical significance. There was a significant difference in three of the following clinical outcomes, including triage to 1<sup>st</sup> IV/IN pain medication (t=1.85; p=0.034), first IN/IV medication to pain reassessment (t=3.75; p<0.001), and length of stay in the emergency department (t=2.84; p=0.003)



\*Please see handout for full pathway

### PRACTICE IMPLICATIONS/FUTURE WORK

- Continue to trend the outcomes of the pathway of the sickle cell pain pathway and adjust as see fit and as medicine continues to advance.
- The sickle cell pathway team will continue to meet quarterly to review the pathway and review data.
- Future research should focus on ways to decrease the amount of time between first IV opioid to second IV opioid and increase the use of 2 doses of IN fentanyl as recommended by the ASH 2020 guidelines

### LIMITATIONS

- Small sample size (n=23)
- Short time frame for data collection (15-weeks)
- Changes in staff in the emergency department
- An inpatient sickle cell pain pathway was also being developed alongside the ED pain pathway, which could lead to confusion on which pathway should be utilized
- Reports of patients refusing medications on the pathway and issues obtaining IV access, which lead to prolonged times from triage to first medication

### CONCLUSION

The implementation of a sickle cell pain pathway in the emergency department decreases triage time to first pain medication, time between the first opioid to pain reassessment, time between first opioid to second opioid, admission rates, and length of stay in the emergency department, and increases the proportion of patients who receive two doses of IN fentanyl.