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Sickle Cell Disease: Development of an Acute Pain Management Program in a Hematology/Oncology Practice

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Abstract

Background: Patients with sickle cell disease experience can experience acute episodes of severe pain that require prompt pain medication. Treating uncomplicated, acute sickle cell disease pain in the emergency department setting has been shown to be costly and lead to higher rates of hospitalization than similar care in a dedicated outpatient setting.

Objectives: The aim of this article is to outline the program development efforts undertaken to apply current literature findings and evidence-based practice guidelines to create a program development toolkit and business plan for a sickle cell disease acute pain management program in an outpatient hematology practice.

Methods: A review of recent literature, application of implementation frameworks, and an organizational assessment guided the creation of the program development toolkit.

Findings: The proposed business plan with cost-savings analysis demonstrated the need for this organization to create financial partnerships with payers to sustain the acute pain management program. The business plan showed significant cost-savings by treating pain in the outpatient setting and preventing emergency department visits and hospitalization.

Keywords: Program Development. Cost Savings. Anemia, Sickle Cell. Acute Pain. Pain Management.

Implications for Practice:

- Intentional program development must be guided by evidence-based frameworks, implementation strategies, and sustainability plans.
- A thorough organizational assessment, analysis of strengths, weaknesses, opportunities, and threats, with considerations of outside factors impacting the organization is key to tailor the program development initiative.
- An in-depth business plan and partnerships with payers will be instrumental in adoption and long-term sustainability of the program development initiative.

Sickle Cell Disease: Development of an Acute Pain Management Program in an Outpatient Hematology/Oncology Practice

In the United States (U.S.), it is estimated that 100,000 Americans have sickle cell disease (SCD), a group of inherited blood disorders (Centers for Disease Control [CDC], 2020). Of the many potential complications of SCD, vaso-occlusive crises (VOC) have been the most common cause for hospitalization among SCD patients (Shah et al., 2019). Vaso-occlusive crises are difficult to predict and the lack of SCD specialty clinics leads to the increased utilization of acute care (Andemariam & Jones, 2016). Many SCD patients are incorrectly characterized as opioid seeking or are not properly prioritized in the emergency department (ED), resulting in costly and frequent hospital admissions (Lanzkron et al., 2015; Telfer & Kaya, 2017). Frequent treatment in the ED results in both negative health-related quality of life and poor financial outcomes (Rousseau et. al., 2020).

In addition to reduced quality of life for patients with sickle cell disease, $811.4 million were spent on inpatient care for patients with SCD in 2016 (Fingar et al., 2019).To increase the quality of care and reduce costly ED visits, studies have examined the feasibility and cost efficacy of sickle cell disease infusion centers to manage acute pain (Benjamin et al., 2000; Lanzkron et al., 2015; Rousseau et al., 2020). The seminal study by Benjamin et al. (2000) examined the impact of a “day hospital,” functioning as an outpatient clinic; a new model of care for patients with uncomplicated VOC pain. This clinic improved ED utilization rates, inpatient stays, and cost of care. The purpose of this article is to outline the program development efforts undertaken to apply current literature findings, evidence-based practice, and recently updated acute pain guidelines from the American Society of Hematology (Brandow et al., 2020) to create

a program development toolkit and business plan for a SCD acute pain management program in an outpatient hematology practice.

Methods

Literature Review

A comprehensive search was conducted in the CINAHL Complete, PubMed, and ProQuest Medical electronic databases for qualitative and quantitative research studies, in the English language, during the period of 2010-2020. Populations included were adult SCD patients over the age of 18 in outpatient, specialty, or ancillary clinics. Emergency department care was excluded. Interventions included studies that developed a SCD care model in outpatient settings with the goal to improve quality metrics and cost-savings. The seminal work of Benjamin et al. (2000) and sources within the grey literature were also included.

Summary of Findings

The most important themes of the literature review included management of pain crises, providers of care, and improvement metrics. Rapid pain assessment, triage, and decreased time to administration of analgesia was prioritized by multiple studies as well as the treatment of underlying pain triggers such as hypoxia and dehydration (Andemariam & Jones 2017; Benjamin et al., 2000; Lanzkron et al., 2015; Rousseau et al., 2020). Tailored analgesia based on the patient's prior response and previous treatment plan were emphasized. Staffing models were similar among the studies but access to social work or psychiatry is an important distinction. All studies included patient access to social work or psychiatry embedded at least part-time in the clinic.

Overall, reductions in hospitalizations, ED utilization, and hospital length of stay were achieved as a result of the development of acute pain management programs in the outpatient

setting (Andemariam & Jones, 2017; Benjamin et al., 2000; Lanzkron et al., 2015; Rousseau et al., 2020). Andemariam and Jones (2017) reported a 50% decrease in average hospital length of stay and decrease in ED visits. Rousseau et al. (2020) reported a 79% reduction in inpatient days through outpatient management and changes to inpatient pain protocols for hospitalized SCD patients. Rousseau et al. (2020) reported a 63% decrease in ED visits for acute SCD pain.

Evidence-Based Guidelines

In June 2020, Brandow et al. published the *American Society of Hematology 2020 Guidelines for Sickle Cell Disease: Management of Acute and Chronic Pain*. These guidelines emphasized the challenge of treating pain in SCD patients due to the complex biology of acute and chronic pain and the need for individualized application of the guidelines (Brandow et al., 2020). Pain is influenced by a complex myriad of biological, physiologic, social, and psychological factors as emphasized by the Biopsychosocial Model (Gatchel, 2004). In understanding this, Brandow et al. (2020) recommended an interdisciplinary approach to pain management with both pharmacologic and non-pharmacologic interventions. These recommendations combined with the findings of the literature review highlight the importance of including access to social work in any SCD acute pain program development initiative.

The American Society of Hematology's (ASH) recommendations for acute pain management were a timely and needed resource for this program development project. The most pertinent recommendations include rapid assessment and administration of analgesia with reassessment, tailored opioid dosing for acute pain, and utilization of SCD-specific hospital-based acute care facilities such as infusion centers over ED-based care (Brandow et al., 2020). In the literature review, close attention to the setting and distance of the hematology clinics to acute care was key to understanding how to develop a safe model of care to treating acute pain. The

utilization of these guidelines further strengthened the evidence-based foundation of this program development endeavor.

Organizational Assessment

In this program development initiative, the thorough organizational assessment was crucial to applying the findings of the literature review and the recent ASH guidelines for SCD pain management. The McKinsey 7S Model (Waterman, Peters, & Philips, 1980) was chosen to examine the organization and program development endeavor from a business perspective. This was achieved through interviews with stakeholders, importantly those in leadership and direct care roles already aiding SCD patients during their acute pain crises. The McKinsey 7S Model (Waterman, Peters, & Philips, 1980) was used to analyze structure, systems, style, staff, skills, strategy, and superordinate goals that contribute to effective organizations. This framework helped to identify weaknesses and strengths of the program development endeavor in the identified organization. Analyzing the staffing of the clinic, it was noted that there was no access to psychiatry at this time and very limited access to social work due to its location at another clinical site. The organization also lacked a specific care flow to rapidly administer analgesia in the clinic and no organizational policy for outpatient pain management.

Guiding Framework

The guiding framework for this program development initiative was the Consolidated Framework for Implementation Research (CFIR) developed by Damschroder et al. (2009). The CFIR model was vital in this program development initiative as it emphasizes the need for the intervention to be flexible to the organization to create a good fit, while maintaining its "core components" that are essential and cannot be changed. The "inner setting" of the organization's culture, networks, and affiliations were identified through the organizational assessment, but

very important to consider is also how the "outer setting" impacts the organization. The "outer setting" includes the economic and social context in which the organization resides. As this hematology/oncology organization is not a part of a clinically integrated network tied to an acute care setting, knowing the "outer setting" and its role in refining the intervention became crucial as the business plan for the acute SCD pain management program was developed (Damschroder et al., 2009).

Findings

Program Development Toolkit

The Program Development Toolkit for the SCD acute pain management program was based around three components: quality monitoring, quality care delivery and the business plan. The toolkit components are outlined in Table 1.

Table 1

Program Development Toolkit Components

Guiding Component	Toolkit Component
Quality Monitoring	• Billing and coding worksheet. • Data collection and analysis tool populated with pre-implementation data. • Sustainability plan and implementation recommendations.
Quality Care Delivery	• Organizational policy. • Evidence-based care flow for triage and analgesia administration. • Handoff tool tailored for acute SCD pain. • Patient and family education.
Fiscal Responsibility	• Business plan, pro forma budget, and cost-savings analysis.

Note. Toolkit components support the development of a sickle cell disease acute pain management program in an outpatient hematology practice.

Quality Monitoring

In relation to quality monitoring, pre-implementation data was collected on ED visits, hospitalizations, and hospital length of stay for all acute care settings in the metropolitan area. This chart review confirmed there were many episodes of acute pain managed in the ED that were appropriate for management in the outpatient clinic. A guide to replicate the data collection process post-implementation was created with an analysis plan. Recommendations for future metrics to monitor related to clinic and triage volumes were also provided. An evidence-based implementation and sustainability plan was created tailored to the organization with recommended implementation methods, targeted audiences, recommended materials, and follow up.

Quality Care Delivery

Related to quality care delivery, an organizational policy was created outlining strict triage criteria to ensure patient safety when determining if the patient should seek pain management in the hematology office or ED setting. The policy also defined assessment and documentation by clinicians and identified how often patients may come to the clinic each week for acute pain episodes and how many doses of tailored analgesia may be administered. The flowsheet for analgesia administration was created to facilitate rapid analgesia treatment by standardizing a process for registration, nursing assessment, provider notification, and utilizing standing orders. The acute pain management flowsheet was informed by a quality improvement project by Whiteman et al. (2015) to decrease wait time for analgesia. Patient and family education for the change in care delivery was created for distribution once the program was implemented. In creating this toolkit, the most important sustainability consideration for this program development initiative would be securing alternate forms of funding from payers and community partners to move this initiative forward.

Business Plan

The business plan for this program development initiative was the most crucial component for future program implementation and long-term sustainability. The organization provided reimbursement information for specific billing codes across their four major payers. The current payer mix was kept consistent when accounting for increases in additional visits, services, or medication. The business case was created accounting for three potential scenarios: a very modest increase in acute pain visits to the hematology clinic (leading to the same number of saved ED visits), a moderate increase, and an aggressive increase. The aggressive case is what was cited most commonly in the literature, but the figures chosen as a modest increase seemed most likely. Since this hematology clinic is not affiliated with an acute care setting, it was determined that pain treatment would likely be more conservative than the studies in the literature review. Costs were assigned to each ED visit and inpatient days as indicated in recent literature. Creation of a consolidated statement of operations for the sickle cell acute pain management program highlighted the true importance of the "outer setting" for shaping the intervention in the Consolidated Framework for Implementation Research (Damschroder et al., 2009).

The consolidated statement of operations determined the increase in revenue for the clinic from increased established patient visits and reimbursement from billing codes for intravenous medication administration, hydration, and analgesia. Expenses reflected were adding a part-time social worker with benefits to the acute pain management program, time to educate the physicians, nurse practitioner, registered nurses, and front office staff on the new care flow and pain management policies. Patient care time for the increased visits was split between the nurse practitioner and physician. Across all three business case scenarios, the increase in patient visits,

with consistent insurance payer mix, did not generate enough projected revenue to offset the personnel costs of the acute pain management program. A summary of the business plan is shown in Table 2.

Table 2

Summary of Business Plan

	Business Case		
	Low	Base	Aggressive
Forecasted Improvement Outcomes			
Decrease in Inpatient Hospital Days • Andemariam & Jones (2017): 50% decrease. • Rousseau et al. (2020): 79% decrease.	35%	50%	65%
Annual Inpatient Days Saved in Clinic Sample	239.8	342.5	445.3
Decrease in ED Visits • Andemariam & Jones (2017): 50% decrease. • Rousseau et al. (2020): 63% decrease.	10%	30%	50%
Annual ED Visits Saved in Clinic Sample	29	88	146

Assumptions	**Costs**
Average expense per inpatient day • Becker's Healthcare (2019).	$2,298
Average expense per ED visit • Moore & Liang (2020).	$530
Assumed decrease in annual ED visits for acute pain led to same increase in outpatient visits.	

	Business Case Summary		
Year 1 of Operation	Total Operating Income (Loss)		
Consolidated Statement of Operations • Impact to Organization	($51,279.61)	($43,201.93)	($35,261.16)
Projected Cost Savings Analysis • Impact to Payers/Organization	$515,035.88	$790,503.07	$1,065,303.34

Note. This table summarizes key assumptions and costs, as well as the literature findings used to project the consolidated statement of operations and the projected cost savings analysis.

Summary of Business Plan Analysis

From the micro view of the organization, implementation of the SCD acute pain management program would have projected a loss of $35,000 in the aggressive business case to

$51,000 in the low business case annually. This is because the organization is not part of a clinically integrated network with payers and acute care providers. The projected cost savings analysis reflects the same costs and revenue as the consolidated statement of operations but considers in the impact of the SCD acute pain management program on reduced ED visits and saved inpatient days. The cost mitigation was based on the projected business cases of the SCD acute pain treatment in the hematology clinic. Treatment of uncomplicated pain in the clinic setting was shown to have a lower rate of hospitalization than similar ED care in the literature (Benjamin et al., 2000; Lanzkron et al., 2015; Telfer & Kaya, 2017).

From a macro or systems view, implementation of a SCD acute pain management program projected considerable cost savings. The saving of ED visits and hospitalized days led to large cost mitigation for the payers and acute care settings in the community. In the most conservative business case scenario, the total cost savings was just above $515,000 annually and in the most aggressive case scenario, which reflects the findings in the literature, the cost savings was $1,065,000 annually.

Implications for Practice

Intentional Development

Intentional program development was the solution to care that was cost effective, evidence-based, and sustainable to manage acute pain for adults with SCD in an outpatient hematology/oncology organization. Critical appraisal of current evidence-based guidelines and literature review were the base of the development endeavor. Considerations related to location of the clinic, current staff, members of the multidisciplinary team, limits to clinics use, and safety for patients were prioritized. This development followed the guide of Damschroder et al. (2009). The core of the intervention was rapid, tailored analgesia to adults with SCD in acute pain, as

outlined in the new SCD acute pain management guidelines from Brandow et al. (2020). The adaptable periphery considerations were the frequency of use of the program, number of repeat doses appropriate in this outpatient clinic, and triage criteria to determine if care acuity was too high for the clinic. Understanding these facets of the program development endeavor clarifies what is adaptable and what is foundational in future quality improvement initiatives.

Partnerships with Payers

Utilizing an evidence-based framework such as the Consolidated Framework for Implementation Research (Damschroder et al., 2009) encourages considerations of the landscape outside of the organization taking on the program development endeavor. The importance of a business plan cannot be understated. Considerations for multidisciplinary staff, costs and reimbursement, insurance payer mix, coupled with literature to support projected decreased ED visits and hospitalization were used. In planning the program development endeavor, the organizational assessment demonstrated one of the weaknesses was that there was no direct return on investment as the hematology/oncology organization was separate from all three organizations providing acute care in the metropolitan area. This highlighted the need to propose partnerships with insurance payers for SCD patients in order to realize the potential cost savings from reduced ED visits and hospitalizations at the systems level.

Conclusion

Purposeful program development grounded in evidence-based practice identified the need to form financial partnerships to ensure successful and sustainable program development to serve adults with sickle cell disease. Removing barriers to care, increasing continuity in care delivery, and improving communication between the hematology/oncology organization and community

partners through standardizing care protocols has the potential to increase the quality of care while decreasing costs.

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Development of a Sickle Cell Acute Pain Management Program within a Hematology Practice

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DNP Project Final Defense

April 12, 2021

Grand Valley State University
Kirkhof College of Nursing

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  - Dr. Barbara Hooper DNP, MSN, RN, CHSE, NE-BC
  - Dr. Tanya Rowerdink DNP, RN, NP-C, CCD

Objectives for Presentation

Upon the completion of this presentation the following objectives will be addressed:

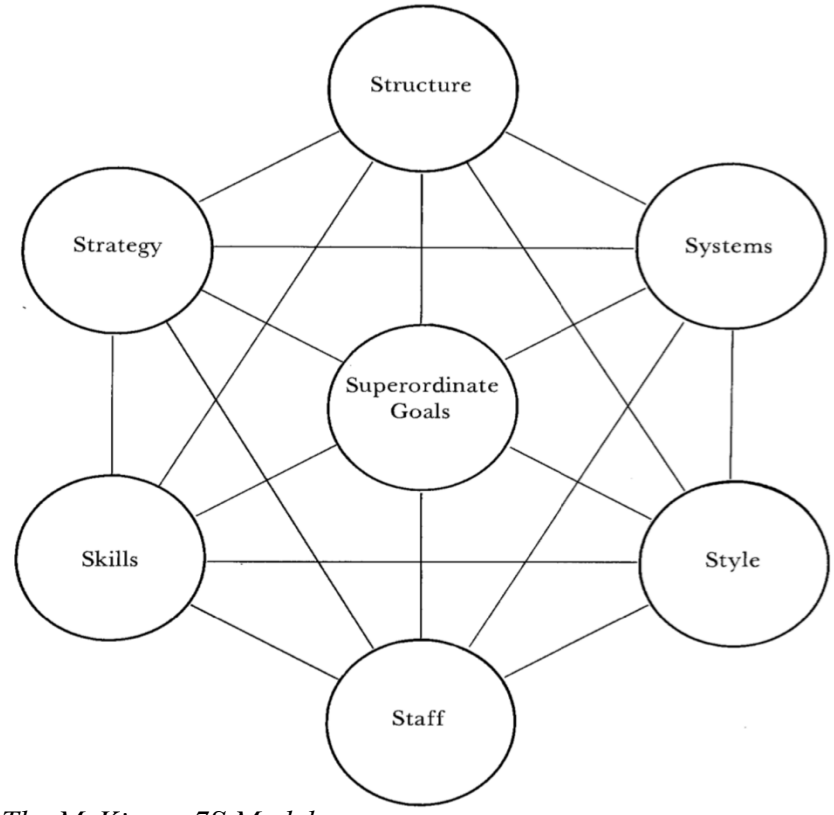
1. Review the clinical problem.
2. Review the intervention setting and summary of organizational assessment findings.
3. Review findings of literature review related to reduction of emergency department visits and hospitalization in sickle cell disease (SCD) patients.
4. Review models and frameworks used to support the methods of program development.
5. Review toolkit objectives, deliverables, business plan, and next steps for the organization.
6. Review enactment of DNP Essentials.
7. Obtain approval of final project defense.

Background

- SCD inpatient care costs totaled $811.4 million in 2016 (Fingar et al., 2019).
- Over 75% of SCD inpatient stays in 2016 were due to vaso-occlusive (VOC) pain (Fingar et al., 2019).
- 40% of emergency department (ED) visits for VOC pain are admitted to the hospital with an average length of stay (LOS) of 5 days

  (Fingar et al, 2019; Lanzkron et al., 2015).

Assessment of Organization: The McKinsey 7S Model



The McKinsey 7S Model (Waterman, Peters, & Phillips, 1980).

Staff:

- Limited access to social work.

Systems:

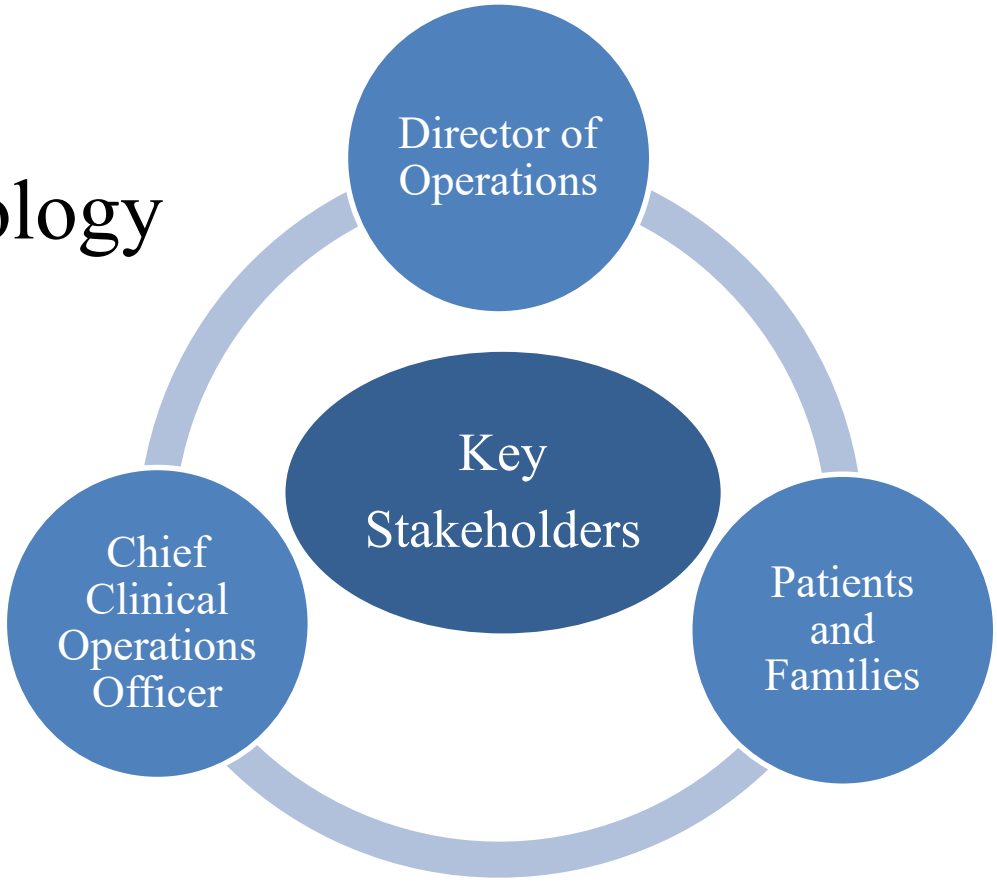
- Lacking for SCD acute pain:
  - Clinic care flow.
  - Organizational policy.
- No tracking of ED visits or inpatient days.
- Electronic medical records do not interface.

Structure:

- Not in a clinically integrated network.

Setting & Key Stakeholders

- **Setting:**
  - Midwest hematology/oncology private practice.
- **Participant:**
  - Director of Operations



Clinical Practice Question

- What is a cost effective and sustainable, evidence-based program to treat acute sickle cell disease pain implemented in an outpatient hematology clinic?

Ethical Considerations

- CITI training completed
- HIPAA compliant chart review
  - De-identified data: number of ED visits, clinic visits, hospitalizations, and hospital length of stay.
- GVSU IRB Determination: Not Research
- Data Security

Available Knowledge: Aims

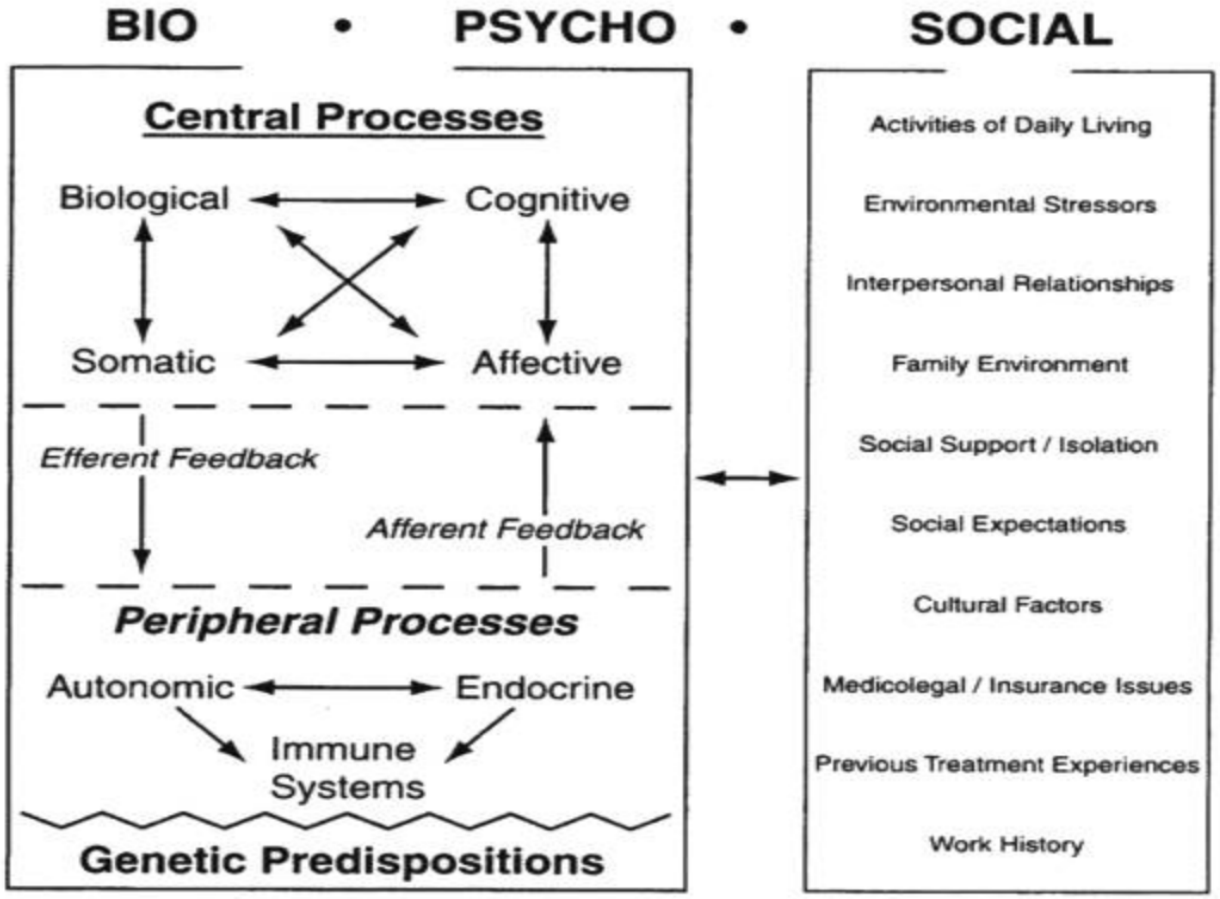
The aims of the literature review answer the following questions:

- What is the potential cost effectiveness of an evidence-based SCD care delivery model implemented in an outpatient hematology clinic?
- What are the evidence-based interventions and quality metrics in an outpatient SCD care delivery model that decrease ED utilization?

Available Knowledge: Results

Theme	Literature Synthesis
Management of Pain Crises	• Rapid assessment and treatment with analgesia (Benjamin et al., 2000; Lanzkron et al., 2015). • Treatment of underlying pain triggers (Benjamin et al., 2000). • American Society of Hematology 2020 acute pain guidelines: •Tailored pain management (Brandow et al., 2020).
Providers of Care	• Key difference: • All studies employed Psychiatrist or Social Worker (Andemariam & Jones, 2016; Artz, Whelan, & Feehan, 2010; Benjamin et al., 2000; Lanzkron et al., 2015).
Improvement Metrics	• All studies: Number of ED visits, ED visits leading to hospital admission, average hospital LOS, and 30-day readmission rate (Andemariam & Jones, 2016; Artz, Whelan, & Feehan, 2010; Benjamin et al., 2000; Lanzkron et al., 2015). • Estimated cost-reduction in SCD clinic care compared to similar ED care (Benjamin et al., 2000).

Biopsychosocial Model



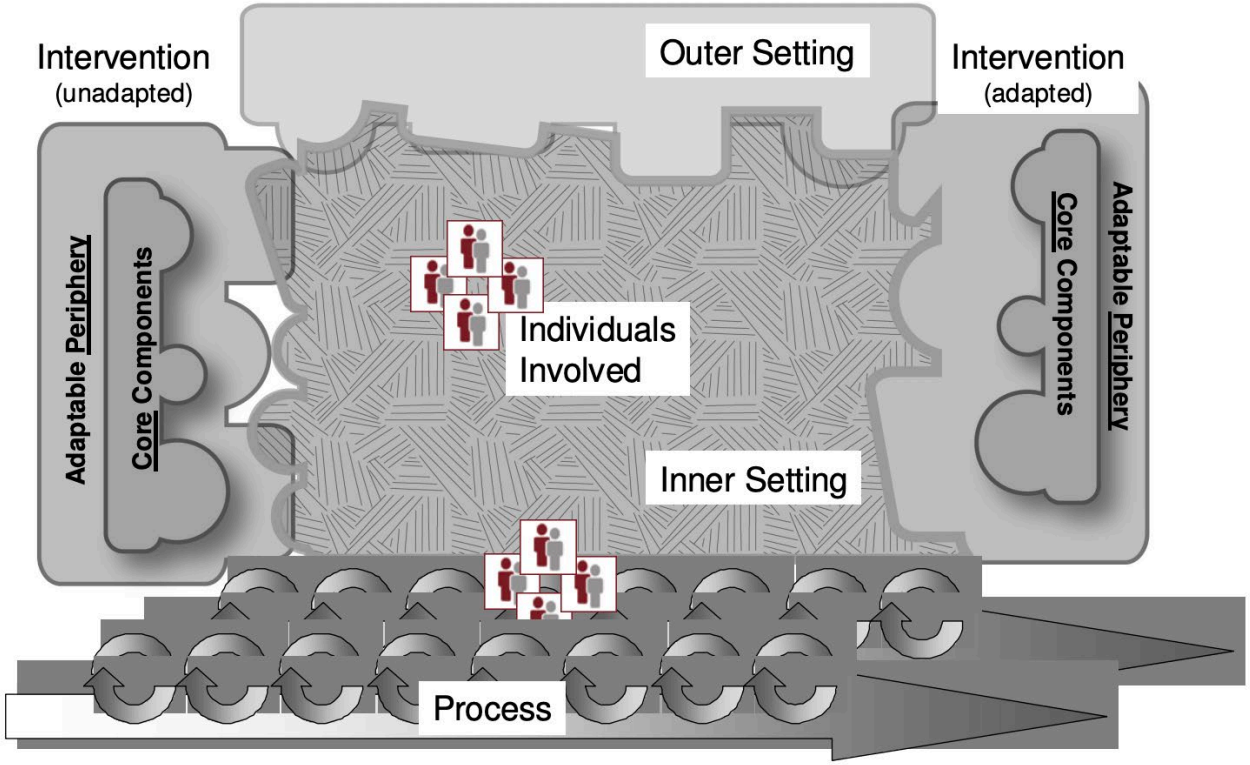
A conceptual model of the biopsychosocial interactive processes involved in health and illness (Gatchel, 2004).

PROJECT METHODOLOGY

Purpose and Project Type

- **Purpose:** Collaborate with an established outpatient hematology clinic to address the gap in analgesia management of acute SCD pain in the specialty clinic setting and improve outcomes for the patient and organization.
- **Program Development:** Design an evidence-based, sustainable program to treat acute SCD pain in the hematology clinic setting and decrease ED utilization.

The Consolidated Framework for Implementation Research (CFIR)



The major domains of the CFIR representing how domains interact in substantive and complex ways to influence the effectiveness of implementation efforts (Damschroder et al., 2009).

Project Design

- Three major components:
  - Quality Monitoring
  - Fiscal Responsibility
  - Quality Care Delivery
- Each project objective is met by the toolkit deliverable.
- All deliverables and objectives are aligned with one of the three components.

Project Objectives & Timeline

- **Objectives:**
  1. Identify billing codes for analgesia visits, relevant ICD-10 codes, and determine costs with key stakeholders by December 4, 2020.
  2. Collect pre-implementation data related to ED visits, hospitalizations, and clinic visits for SCD pain, and social work consults by December 4, 2020.
  3. Establish policy criteria for analgesia administration, follow-up, and transfer of unstable SCD pain to acute care, and follow-up by January 31, 2021.
  4. Standardized care flowsheet for analgesia administration and other interventions for acute SCD pain by February 28, 2021.
  5. Create standardized Nurse-to-Nurse handoff tool for transfer of care by February 28, 2021.
  6. Create patient and family education to promote use of hematology clinic for acute SCD pain by February 28, 2021.
  7. Creation of pro forma budget with cost-savings analysis to validate program implementation by March 14, 2021.
  8. Creation of proposed post-implementation sustainability plan by March 14, 2021.
  9. Presentation of program development toolkit to organizational stakeholders by April 30, 2021.
  10. Final defense presentation and upload final defense into Scholar Works by April 30, 2021.

Measures and Analysis

- **Toolkit Deliverables:**
  - Microsoft Word document or Excel workbook populated with data outlined in the deliverable.
  - File can be accessed and edited by organizational stakeholders once saved to an encrypted flash-drive.

Project Budget

- Personnel costs estimated based on average regional salaries (Salary.com, 2020).
- Costs related to equipment needed for program development (in-kind donation).

Revenue	
Project Manager Time (in-kind donation of student)	10,500.00
Team Member Time:	
Site Mentor- Director of Operations	3,210.00
Consultations	
Statistician (in-kind donation)	100.00
Equipment	
Student laptop (in-kind donation of student)	800.00
Encrypted flash-drive (in-kind donation of student)	40.00
TOTAL INCOME	14,650.00

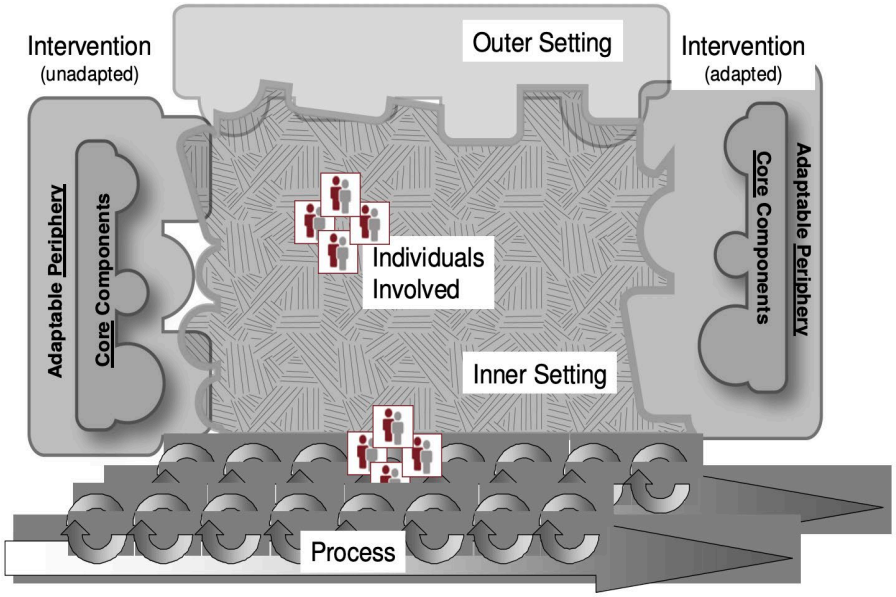
Expenses	
Project Manager Time (in-kind donation of student)	10,500.00
Team Member Time:	
Site Mentor- Director of Operations	3,210.00
Consultations	
Statistician (in-kind donation)	100.00
Equipment	
Student laptop (in-kind donation of student)	800.00
Encrypted flash-drive (in-kind donation of student)	40.00
Meeting space	0.00
TOTAL EXPENSES	14,650.00
Net Operating Plan	0.00

RESULTS

Deliverables Aligned with Frameworks

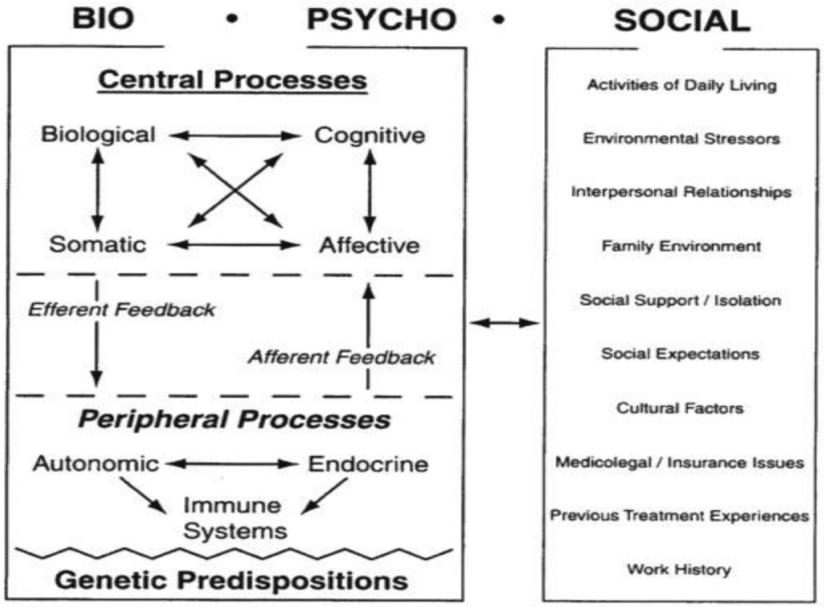
Consolidated Framework for Implementation Research

(Damschroder et al., 2009)



Biopsychosocial Model

(Gatchel, 2004)



Deliverable Table of Contents

Theme	Deliverable	Alignment with CFIR (Damschroder et al., 2009)	Characteristics/Target
Quality Monitoring	Billing and coding worksheet with ICD-10 codes and CPT codes used in documentation.	Inner setting, outer setting, individuals involved.	• Revenue generation. • Benign Hematology Site Manager.
	Excel dashboard populated with pre-implementation data with guide for organization to collect post-implementation data, evaluation, guide for analysis, and data dictionary.	Inner setting, outer setting, individuals involved.	• Tailored program analysis. • Guide for standardized data collection. • Benign Hematology Site Manager and Benign Hematology RNs.
	Worksheet of recommendations for sustainability and implementation if program is implemented.	Inner setting, outer setting, individuals involved.	• Evidence-based, tailored sustainability guide. • Benign Hematology Site Manager.
Fiscal Responsibility	Pro forma budget to implement program with cost-savings analysis and business case analysis.	Inner setting, outer setting. Biopsychosocial Model applied (Gatchel, 2004).	• Revenue generation. • Benign Hematology Site Manager, Director of Operations, Chief Clinical Operations Officer.

Deliverable Table of Contents (Continued)

Theme	Deliverable	Alignment with CFIR (Damschroder et al., 2009)	Characteristics/Target
Quality Care Delivery	Organizational policy outlining evidence-based triage, analgesia administration, when patient to be transferred, and follow-up.	Inner setting, individuals involved. Biopsychosocial Model applied (Gatchel, 2004).	• Evidence-based practice. • Benign Hematology RNs, Nurse Practitioner, Physicians, front office staff, and telephone operators.
	Evidence-based care flow for standardized acute pain management in with tailored analgesia.	Inner setting, individuals involved. Biopsychosocial Model applied (Gatchel, 2004).	• Evidence-based practice. • Benign Hematology RNs, Nurse Practitioner, Physicians, front office staff, and telephone operators.
	Nurse-to-Nurse handoff worksheet specific to SCD pain interventions.	Inner setting, individuals involved.	• Evidence-based practice. • Benign Hematology RNs.
	SCD patient/family education handout.	Inner setting, individuals involved. Biopsychosocial Model applied (Gatchel, 2004).	• Evidence-based practice. • SCD patients and families.

Deliverable: Billing and Coding Worksheet

- Breakdown across all four major insurers: Medicare, Medicaid, XXX, and XXX.
- Currently utilized in practice: E/M Codes, CPT Codes, and J-Codes.

Code	Definition	Medicaid	Medicare	XXX	XXX
	E/M Codes				
99214	Office visit, established patient, level 4, moderate medical decision making.	**$60.62**	**$125.82**	**$125.80**	**$116.52**

Deliverable: Data Collection/Evaluation Dashboard

- Tailored program analysis and guidelines for standardized data collection.
- Recommended areas for future analysis post-implementation.

Current Metrics: SCD Acute Pain Calendar Year 2020	
Sample size: 45	ED visits: 292
Number of male patients: 24	Hospitalizations : 85
Average age: 34.5	Hospitalized days: 685

Recommended Post-Implementation Metrics	
Number of Social Work visits for SCD patients.	Patients discharged home from clinic.
Number of "pain" phone triage tickets.	Patients directly admitted to hospital observation unit.
Created RN phone triage log for patients meeting policy criteria for clinic care and if not, tracking which criteria.	Patients directly admitted to hospital inpatient unit.

Deliverable: Sustainability Recommendations

- Evidence-based sustainability recommendations (Hailemarium et al., 2019).
- Recommendations aligned to each deliverable with target audience and frequency of follow-up.

Theme	Deliverable	Sustainability Recommendation (Hailemarium et al., 2019)
Quality Monitoring	Excel data collection and analysis dashboard.	• Organizational leader/stakeholder prioritizing and continued use. • Maintenance of staff buy-in.
Quality Care Delivery	Organizational policy: triage and analgesia administration.	• Maintenance of workforce skills through continued training, booster training sessions, supervision, and feedback. • Organizational leader stakeholder prioritizing and continued use.

Deliverable: Implementation Recommendations

- Strategies selected from Expert Recommendations For Implementing Change (ERIC) Project (Powell et al., 2015).
- Each strategy aligned to appropriate deliverable.
- Examples:
  - Develop and implement tools for quality monitoring.
  - Tailor strategies.
  - Develop educational materials.
  - Use other payment schemes.
  - Audit and provide feedback.
  - Obtain patient/family feedback.
  - Promote network weaving.

Deliverable: Organizational Policy

- Evidence-based policy tailored to organization (Telfer & Kaya, 2017; Whiteman et al., 2015).
- Written in format used by organization, assigns responsibilities, and terminology consistent with other policies.
- Established standards for EMR documentation of pain plan.

Index Code: xxxxx
Effective Date: xxxx
Reviewed Date: xxxx

TITLE: MANAGEMENT OF SICKLE CELL DISEASE ACUTE PAIN CRISIS IN XXX CLINIC

Policy Statement:
The standardized process needed to assess, manage, provide follow-up care, and shared decision making for patients with acute sickle cell disease pain.

Deliverable: Care Flow for Acute SCD Pain in Hematology Clinic

- Evidence-based care flow tailored to organization (Telfer & Kaya, 2017; Whiteman et al., 2015).
  - Sickle Cell Acute Pain Triage/Presentation Flow Sheet
  - Sickle Cell Acute Pain RN Flow Sheet
- Assigns role to responsibilities and terms congruent with organizational policy.
- Specifies EMR documentation standards for medication administration and frequency of nursing pain assessment.

Deliverable: Handoff Tool

- Evidence-based SBAR handoff tool tailored to SCD population in acute pain (Müller et al., 2018).

SCD SBAR Handoff Tool

Situation	• Patient Name: _____ Age: ___ Code Status: ____ • Urgency/Reason for Encounter: _____
Background	• Sickle Cell Disease: _____ Pertinent Comorbidities: _____ • Presentation to Clinic: _____ • Pain control at home: _____
Assessment	• Current Vital Signs: _____ • Onset/Location/Duration/Quality/Relief: _____ • Pain Level: ____ Does patient have individualized pain plan? _____ • Supportive Measures: _____ • Analgesia Used: _____ Last Dose: _____
Recommendation	• Transfer reason: _____ • Mode of transportation: _____ • Family/Equipment: _____

Updated 3/11/2021

Deliverable: Patient/Family Education

- Evidence-based, written to accommodate low health literacy and reading levels (Stossel et al., 2012).

- Describes:
  - New process for tailored pain management in clinic setting.
  - RN triage telephone number and after-hours line.
  - Signs/symptoms that will exclude from treatment in clinic and need care in ED.
  - How many doses of tailored IV pain medication can be received per visit.
  - How many visits for acute pain per week if infusion chair available.

Deliverable: Business Plan

- **Components**
  - Assigned Costs & Assumptions
  - Current State
  - Revenue Analysis Lead Sheet
  - Consolidated Statement of Operations
  - Projected Cost Savings Analysis

- **CFIR:** Financial implications of inner setting and outer setting interaction (Damschroder et al., 2009).

Assigned Costs

- Average cost for ED visit: $530 (Moore & Liang, 2020).
- Average expense per inpatient day in XXX state non-profit hospital: $2,298 (Becker's Healthcare, 2019).
- All E/M, CPT, and J-Codes reimbursed at rate provided by organization.
  - Medicare, Medicaid, XXX, XXX.
- All salaries estimated using online tool (Salary.com, 2020).
- New position for social work with benefits (Ninety-Nine Healthcare Management, 2020; Salary.com, 2020).

Assumptions

- **Payer mix:** breakdown of payers from larger group of SCD patients in organization was applied to sample size.
- **Business case:** low, base, aggressive
  - Decrease in inpatient days 35%, 50%, 65%
    - Rousseau et al. (2020) 79% decrease.
  - Decrease in ED visits 10%, 30%, 50%
    - Rousseau et al. (2020) 63% decrease
    - Andemariam & Jones (2017) 50% decrease
  - Decrease in ED visits led to same number of outpatient clinic visits (99214 code used).

Current State

- Calendar year 2020 (pre-implementation)
  - Current sample: 45 patients
  - ED Visits related to pain: 292
  - Hospitalized days with SCD pain as primary diagnosis: 685
- Total estimated costs for ED visits and hospitalized days was $1,728,890.

Revenue Analysis Lead Sheet

Low Increase in Forecasted Outpatient Visits (99214)

Coverage Type	*SCD Payer Mix (applied to low increase in sample size)*	*% by Coverage Type*	*Revenue per Coverage Type (99214)*	*Forecasted Revenue*
Medicare	9	31%	$ 125.82	$ 1,122.70
Medicaid	5	18%	$ 60.62	$ 324.55
xxx	8	29%	$ 125.80	$ 1,066.40
xxx	4	14%	$ 116.52	$ 467.87
OOP	2	8%	$ -	$ -
	29	100%		$ 2,981.52

Base Increase in Forecasted Outpatient Visits (99214)

Coverage Type	*SCD Payer Mix (applied to base increase in sample size)*	*% by Coverage Type*	*Revenue per Coverage Type (99214)*	*Forecasted Revenue*
Medicare	27	31%	$ 125.82	$ 3,406.82
Medicaid	16	18%	$ 60.62	$ 984.84
xxx	26	29%	$ 125.80	$ 3,235.96
xxx	12	14%	$ 116.52	$ 1,419.75
OOP	7	8%	$ -	$ -
	88	100%		$ 9,047.37

Aggressive Increase in Forecasted Outpatient Visits (99214)

Coverage Type	*SCD Payer Mix (applied to aggressive increase in sample size)*	*% by Coverage Type*	*Revenue per Coverage Type (99214)*	*Forecasted Revenue*
Medicare	45	31%	$ 125.82	$ 5,652.22
Medicaid	27	18%	$ 60.62	$ 1,633.94
xxx	43	29%	$ 125.80	$ 5,368.76
xxx	20	14%	$ 116.52	$ 2,355.50
OOP	11	8%	$ -	$ -
	146	100%		$ 15,010.42

Consolidated Statement of Operations Post Year 1

	Business Case		
	Low	Base	Aggressive
Revenue			
Established Patient Code			
99214 (increased due to prevented ED visits for acute pain)	$ 2,981.52	$ 9,047.37	$ 15,010.42
CPT			
96360- IV Hydration, 31-60 minutes	1,048.64	3,182.09	5,279.38
96374- IV Medication Administration IV push, 1st dose	1,154.69	3,503.89	5,813.27
J-Code			
J7030- Sodium chloride 0.9% 1000ml	67.02	203.37	337.42
J2270- Morphine sulfate 2mg/ml	74.26	225.33	373.85
Total Revenue	**$ 5,326.14**	**$ 16,162.07**	**$ 26,814.34**
Expenses			
Healthcare Professional Time Reallocation			
Medical Social Worker (0.5 FTE, 0.7 overhead rate, annual salary $65,000)	$ 55,250.00	$ 55,250.00	$ 55,250.00
Patient Care Time			
Physician ($144/hour x .5 hour x 50% acute pain SCD visits)	1,044.00	3,168.00	5,256.00
Nurse Practitioner ($43/hour x .5 x 50% acute pain SCD visits)	311.75	946.00	1,569.50
Total Expenses	**$ 56,605.75**	**$ 59,364.00**	**$ 62,075.50**
Total Operating Income (Loss)	**$ (51,279.61)**	**$ (43,201.93)**	**$ (35,261.16)**

Projected Cost-Savings Analysis Post Year 1

	Business Case		
	Low	*Base*	*Aggressive*
Revenue			
Established Patient Code			
99214 (increased due to prevented ED visits for acute pain)	$ 2,981.52	$ 9,047.37	$ 15,010.42
CPT			
96360- IV Hydration, 31-60 minutes	$ 1,048.64	$ 3,182.09	$ 5,279.38
96374- IV Medication Administration IV push, 1st dose	1,154.69	3,503.89	5,813.27
J-Code			
J7030- Sodium chloride 0.9% 1000ml	67.02	203.37	337.42
J2270- Morphine sulfate 2mg/ml	74.26	225.33	373.85
Cost Mitigation			
Emergency Department Visit (average $530 per visit)	15,370.00	46,640.00	77,380.00
Hospital Expense per Inpatient Day ($2,298 MI Non-Profit Hospital)	550,945.50	787,065.00	1,023,184.50
Total Revenue	**$ 571,641.63**	**$ 849,867.07**	**$ 1,127,378.84**
Expenses			
Healthcare Professional Time Reallocation			
Medical Social Worker (0.5 FTE, 0.7 overhead rate, annual salary $65,000)	$ 55,250.00	$ 55,250.00	$ 55,250.00
Patient Care Time			
Physician ($144/hour x .5 hour x 50% acute pain SCD visits)	1,044.00	3,168.00	5,256.00
Nurse Practitioner ($43/hour x .5 x 50% acute pain SCD visits)	311.75	946.00	1,569.50
Total Expenses	**$ 56,605.75**	**$ 59,364.00**	**$ 62,075.50**
Total Operating Income (Loss)	**$ 515,035.88**	**$ 790,503.07**	**$ 1,065,303.34**

Business Case Summary

Year 1 of Operation	Business Case Total Operating Income (Loss)		
	Low	Base	Aggressive
Consolidated Statement of Operations • Impact to Organization	**($51,729.61)**	**($43,651.93)**	**($35,711.16)**
Projected Cost Savings Analysis • Impact to Payers/Organization	**$ 514,585.88**	**$ 790,053.07**	**$ 1,064,853.34**

Post Year 1 of Operation	Business Case Total Operating Income (Loss)		
	Low	Base	Aggressive
Consolidated Statement of Operations • Impact to Organization	**($51,279.61)**	**($43,201.93)**	**($35,261.16)**
Projected Cost Savings Analysis • Impact to Payers/Organization	**$ 515,035.88**	**$ 790,503.07**	**$ 1,065,303.34**

Implications for Practice

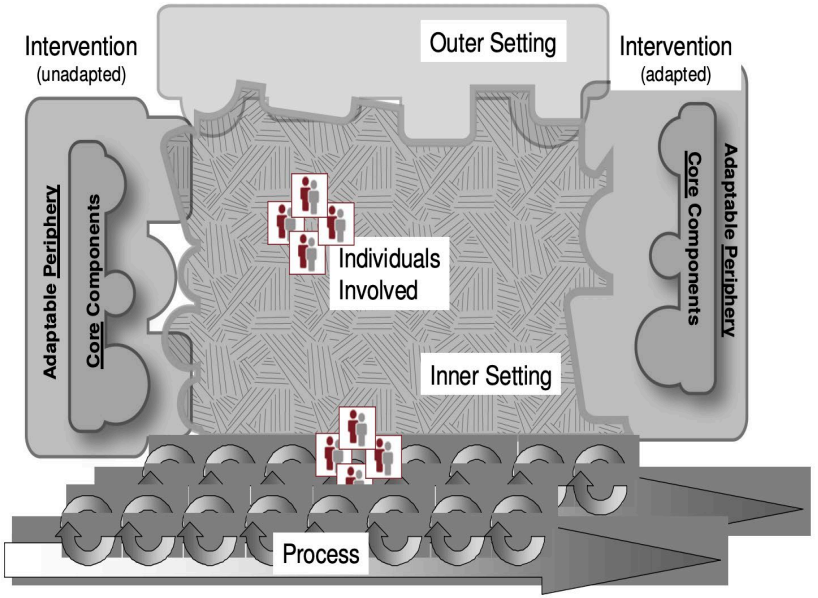
- Potential for cost-savings at community level and improved patient quality of life.
  - Help organization create the case for additional funding from community partners.
- Limitations: Ongoing
  - Need funding to offset clinical operations costs.
  - Location of clinic, distant from acute care.
  - Challenges of EMR interoperability.
    - Data collection
    - Review of hematologist plans of care and pain plan

Sustainability Plan

- Next steps:
  - Partner with insurance companies.
  - Establish new sources of funding for clinic.
  - Adoption of program development toolkit.

Discussion: Guiding Frameworks

- **CFIR** (Damschroder et al., 2009)
  - Inner Setting: Hematology/oncology organization
  - Outer Setting: Community payers and acute care settings
  - Process: Both the inner setting and outer setting shape the program, leading to the adapted state.



(Damschroder et al., 2009)

- **Biopsychosocial Model:** Addition of social work addressed psychosocial factors in pain. Program policies/care flow address pharmacologic pain management (Gatchel, 2004).

Conclusion

An established outpatient hematology clinic identified the need to address the gap in analgesia management of acute SCD pain in the specialty clinic setting and improve outcomes for the patient and organization.

Clinical Question: What is a cost effective and sustainable, evidence-based program to treat acute sickle cell disease pain implemented in an outpatient hematology clinic?

Outcome: Purposeful program development grounded in evidence-based practice identified the need to form financial partnerships to ensure success of SCD acute pain management program.

Dissemination

- Final defense at GVSU
- Present to organizational stakeholders:
  - Chief Clinical Operations Officer
  - Director of Operations
- Upload into Scholar Works
- Manuscript submission

DNP Essentials Reflection

Essential I	Scientific Underpinnings for Practice
Essential II	Organizational and Systems Leadership for Quality Improvement and Systems Thinking
Essential III	Clinical Scholarship and Analytical Methods for Evidence-Based Practice
Essential IV	Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Heath Care
Essential V	Health Care Policy for Advocacy in Health Care
Essential VI	Interprofessional Collaboration for Improving Patient and Population Health Outcomes
Essential VII	Clinical Prevention and Population Health for Improving the Nation's Health
Essential VIII	Advanced Nursing Practice

(American Association of Colleges of Nursing, 2006)

Discussion:

Questions?

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