

Establishment of Nurse Case Manager Role in a Pediatric Orthopedic Team

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ABSTRACT

Purpose/Objectives: Incorporating a nurse case manager (NCM) directly into a pediatric orthopedic department was implemented to address gaps in processes that had previously led to common delays in discharge planning. The orthopedic NCM works within an interdisciplinary team and provides guidance and support for both elective and emergent pediatric admissions. Applying continuous improvement techniques, the NCM role included the review of existing processes and determination of root causes of delays. This article describes some of the unique challenges and new processes included in the NCM role in the pediatric orthopedic setting, several solutions created and implemented to address identified delays, and statistical results of anticipatory discharge planning.

Primary Practice Setting: An NCM role was initiated in the orthopedic department at a quaternary-level freestanding pediatric hospital.

Findings/Conclusions: After interdisciplinary planning and implementation, the NCM role was established within the orthopedic department to facilitate timely, efficient, safe, and sustained discharges of patients. Success was realized through decreased denials and decreased number of avoidable inpatient days. Once rapport was established and streamlined work was developed, a retrospective review of length of stay was conducted to compare time periods prior to and after embedding this position. Changes in discharge planning processes positively affected the average length of stay for patients managed by the NCM. Cost savings are found in decreased avoidable inpatient days, decreased number of denials of inpatient medical necessity, and improved progression of care, which resulted in timely transitions and discharges. The effects of a consignment process and web-based ordering of durable medical equipment were also evaluated. Although this process in and of itself did not seem to impact length of stay, it did foster an improvement in team satisfaction around discharge readiness.

Implications for Case Management: Pediatric orthopedic service teams benefit from the role of the NCM when there is interdisciplinary involvement and a focus on streamlining processes from preadmission through transition of care. Further study in a concurrent design will shed light on other factors that impact length of stay, such as specific diagnoses and medical complexity. Average length of stay is an effective metric for services with a high percentage of elective admissions but may not be as dependable for teams that do not have prescribed lengths of stay. Study with a specific focus around those factors that impact both team and family satisfaction is also indicated.

Key words: case management, discharge planning, orthopedics, pediatrics, return on investment

Acute care case management teams continue to evolve and respond to a changing landscape in health care. The relentless increase in costs across the health care continuum has created an urgent need for providing less expensive care for the populations served and to effect better outcomes/health (Bodenheimer & Sinsky, 2014). In an effort to strategically manage hospital discharges and address common barriers presented during the process, a newer model of case management was introduced at a freestanding quaternary-level pediatric hospital. The role of nurse case manager (NCM) was developed and implemented over the course of several years and is now utilized within care teams throughout the hospital. Effects of including a designated nurse discharge planner have been examined and shown to not only

improve patient satisfaction but also decrease post-discharge ambulatory call volume to the orthopedic team (Mason et al., 2019). As with any newer system, this process involved ensuring efficacy and a return on investment of the new role. Another focus of this process was considering the role in terms of barriers that impact patient/family expectations for discharge (Almoajil, Theologis, et al., 2020).

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Cost savings are found in decreased avoidable inpatient days, decreased number of denials of inpatient medical necessity, and improved progression of care, which resulted in timely transitions and discharges.

Orthopedic surgery in pediatrics is variable but also highly specialized. In most cases, pediatric orthopedics involves outpatient care for minor injuries and trauma, but there are children with congenital musculoskeletal anomalies, osteosarcomas, severe scoliosis, skeletal dysplasia, slipped capital femoral epiphysis, and many other diagnoses that can be common presentations to pediatric orthopedic services. These patients present for a variety of procedures that are critical to ongoing development of mobility, optimal functioning, and/or comfort. Procedures are planned and then authorized by the child's insurer, often with a preset number of inpatient days approved for care to be completed. Medical complexity of the child's underlying health, complications of comorbid conditions, and slower healing may impact this approved length of stay. Children with chronic health challenges, such as those with cerebral palsy, have unique challenges related to orthopedic surgery (Almoajil, Dawes, et al., 2020). Transitions to the postdischarge level of care must be planned in detail to avoid unnecessary delays and to ensure that all resources are in place for the child and the family. Clinical pathways have been recognized as a useful guide in predicting the course of care for elective orthopedic surgical patients (Tanjung & Nurwahyuni, 2019). Although useful for a broad view of the child's stay, these pathways do not account for the unique needs of some of the more medically complex patients seen by this orthopedic service and the potential barriers to discharge that can present without effective discharge planning. Common delays in medically complex patients requiring orthopedic surgery include education, access to durable medical equipment (DME), and access to transportation (Flaugh et al., 2022). Parental need for direction, support, and provision of resources for discharge needs has also been well documented (Ronan et al., 2020).

Established in 1940 as a pediatric orthopedic hospital, this facility has attracted and retained world-renowned orthopedic surgical experts. The hospital has grown over the decades to become a quaternary care Level 1 trauma center with 200 beds. Surgeons and other providers at this health system see patients from across the United States as well as

those arriving from other countries with diagnoses such as skeletal dysplasia, osteogenesis imperfecta, Morquio syndrome, and complex genetic malformations of bone growth. This team of specialists also manages patients with cerebral palsy, whose limbs and spine often require highly specialized corrective surgery to promote optimal mobility and to prevent/minimize painful contractures.

As the hospital grew and became a full-service pediatric hospital, social workers were tasked with managing the discharge needs of patients. These discharge planning tasks were in addition to the other traditional responsibilities of hospital and social workers, such as crisis support, allocation of community resources, and assistance around psychosocial needs. Most often, they received notification of needs for home care and DME on the day of discharge, resulting in end-of-day attempts to locate resources, arrange delivery, and confirm receipt of this necessary equipment and supplies. As patients seeking care at this facility have increased complexity, so too does the discharge process. As part of a multidisciplinary continuous improvement process, the utilization management (UM) department had developed a new nurse-led case management team, focused on fiscal management and patient-centered care. The case managers found better alignment in using a team-based assignment as opposed to a unit-based assignment. As pediatric orthopedic hospitalized patients can be especially complex, this team was poised for the addition of an NCM.

DESIGN/DESCRIPTION

A multidisciplinary steering committee was formed to learn what was most needed of a case manager in the orthopedic setting, especially due to the impact of time these providers were taking to secure DME, apply for prior authorizations, and communicate care needs for management of the child's postoperative course after discharge. The steering committee reviewed length of stay, denials, and appeals to determine a root cause or most prevalent factor in delays in discharge. The UM department recognized a pattern of patients remaining in the hospital beyond the anticipated length of stay; however, it was difficult to discern the causes of delays. Providers were in the operating rooms or clinics, bedside nurses may not be aware of requirements by insurers to secure necessary equipment, and social workers had significant time constraints as they juggled managing psychosocial needs along with challenges related to discharge. The nature of variables involved with orthopedic patients including complexity of surgical procedures, mobility, hardware, dressings, and casts presented barriers that may not have been addressed in a timely manner,

allowing for many patients to remain in the hospital longer than necessary. Higher rates of avoidable inpatient days are often leading indicators of increased denials of reimbursement by insurers.

A seasoned nurse with extensive experience in post-surgical care settings was recruited and hired into the role of NCM. As this role demands an experienced clinical nurse, finding expertise in case management was not as crucial, as there was an available computer-based learning program of didactic generalized case management and transitions of care education. The orthopedic NCM was oriented to UM so that a fundamental understanding could be established regarding the criteria sets used to determine medical necessity for acute level of care, as well as those milestones that predict readiness for discharge. Knowledge of nationally recognized criteria sets is especially important in this role transition from bedside nursing care to case management to afford insight into expected trajectory of care progression. Paired with an experienced NCM, the novice case manager gained insight into when to initiate resourcing home care and DME needs, when to precipitate prescription medication prior authorizations, and how to clearly communicate and document assessments and interventions as they occurred. The precepting NCM came to the institution with 20 years of combined experience in both adult hospital-based

nurse case management and payer-side utilization of management review. Her insights into the importance of proactive, anticipatory discharge planning, as well as the consequences of delays fostered a better understanding of the need for timely care progression and discharge for the newer NCM. Once basic competencies were achieved, the orthopedic NCM began rounding with the assigned orthopedics teams. As this particular service has patients admitted to several nursing units, the new NCM was expected to assess and manage patients on two to four inpatient care units.

The new NCM was included in care meetings and began discharge planning for both predictable and more complex orthopedic patients. Through her participation in these care meetings, she was able to learn which patients would likely require assistance and support in the procurement of needed supplies. Within several weeks, identification was made of several key gaps that had a negative effect on patient progression of care and discharge. Through weekly meetings with the orthopedic advanced practice providers, the team-based social workers, physical therapists, child life therapists, and bedside nurses, these opportunities for improvement were communicated with suggested countermeasures. Table 1 describes the opportunities, the background, effects, and countermeasures to ensure success.

TABLE 1
Identified Gaps and Opportunities

Opportunity	Background	Effect	Countermeasure
Identification of discharge needs was done postoperatively.	Adult patients are routinely informed of DME needs and advised to procure prior to admission.	Needs were identified on postoperative Days 1–3.	Proposed postoperative care needs to be discussed during surgical conference.
Wheelchairs are needed at discharge time for some patients.	Depending on patient complexity and procedure, patient may need a wheelchair at the time of discharge. Wheelchairs can take several days to resource and be delivered.	Wheelchairs for pediatric patients come in multiple sizes; smallest sizes are not stocked by many providers, creating delays in resourcing.	Proposed creation of consignment process that would maintain wheelchairs of all sizes within the hospital.
DME was ordered via fax on the day of discharge.	Social workers did not round with providers and had to wait for request for DME, prescriptions, and other postdischarge needs.	Waiting for providers who were in the operating room or clinic created significant delays in equipment being delivered to families.	Proposed postdischarge needs are to be discussed with families and ordered prior to or on day of surgery for delivery to hospital or family home.
Prescriptions were sent to home-based pharmacies at discharge, not allowing for prior authorization requirements and sourcing to appropriate pharmacies (compounding).	Certain family-identified community pharmacies were unable to compound and dispense some specific medications. This resulted in delays in provider notifications and prior authorizations.	Delays in prior authorizations and availability of medication create delays in treatment, ineffective pain management, and dissatisfaction for families.	Proposed utilizing hospital outpatient pharmacy for initial prescription. Immediate notification to NCM of need for prior authorization; this pharmacy regularly compounds all medications.
Parents are not sure what to do once discharged when equipment or medications were incorrect.	Parents may call the hospital and ask for the provider who may be unavailable, creating delays. Providers may not know how to guide families.	Parents may be confused and unsure where to go with questions/concerns creating delays in care.	Proposed providing NCM information on discharge instructions.

Note. DME = durable medical equipment; NCM = nurse case manager.

Identification of opportunities and the process of creating solid solutions were accomplished through a shift in discharge planning from reactive to proactive. The NCM, in attending presurgical care meetings and in meeting families on day of surgery, created a process in which discharge was discussed, planned, and resourced during the earliest part of the process. This anticipatory perspective was foundational to the countermeasures enacted by the care team. Identification of likely DME needs and preparations for the home, such as removal of throw rugs and the accessibility of a bathroom close to the child's bedroom, were discussed during the preoperative period whenever possible. If contact was not possible prior to surgery, the NCM prioritized meeting families on the day of surgery to gather relevant information.

As social workers had been responsible for some of this work, their insight into the identification of challenges they had experienced was key to understanding the process. One common theme was the difficulty in determining where to obtain DME, the time-consuming nature of printing orders for equipment, and then manually faxing these orders. Social workers also identified several examples of completing requests and later learning from families that equipment had not been delivered. The team learned that a web-based portal for multiple DME providers was available. After ensuring that privacy and compliance concerns were addressed, this newer system was adopted to much satisfaction from the care team. This newer process tracks the order from initial request, through authorizations, request for physician signature, through to delivery. This process does not apply to all families due to payer network and selected DME provider subscription to the portal. If not able to order through the portal, the NCM was still able to fax orders to vendors but worked with the information technology team to develop a secure electronic process. For shorter stay patients or those requiring surgery emergently, another solution was suggested. A consignment process was developed to maintain a small number of different mobility equipment, such as different-sized wheelchairs, bedside commodes, and shower chairs on hand for distribution.

An outpatient retail pharmacy that accepts most major insurance plans in addition to the state and some surrounding states' medical managed care organization plans is on-site at this facility. The NCM worked with the outpatient pharmacists to more frequently offer this option to families, allowing them to leave the hospital with DME in hand or ordered and prescriptions filled. Pharmacists knew whom to contact more readily when prior authorizations were required, which reduced the back-and-forth request for information needed. If parents preferred to have

prescriptions filled at their local pharmacies, the NCM requested these be e-scribed by the provider a day or so prior to the target discharge date to allow time for any required insurance authorizations and for families to obtain them prior to or immediately after discharge.

Discharge instructions have important reminders and information, which are reviewed with families by the bedside nurse before leaving the hospital. In following up with families, the NCM noted that many of them had conveyed confusion about where to go with questions about surgery, medications, DME, or any other postdischarge concerns. As providers and bedside nurses have different schedules, those who cared for the patient may not be readily available for questions. As a nurse and the most consistent member of the team, the NCM suggested adding her contact information to these instructions. She is often able to resolve any immediate questions quickly or can direct the family to the most appropriate resource, reducing the number of times families are transferred or placed on hold.

The NCM began her role with existing trust and mutual respect for knowledge and expertise within the care team. This strong start within the care team, one of the most important group of stakeholders, made identification of gaps and opportunities less difficult to highlight and escalate. As part of the process of initiating this position, time was spent on the delineation of the roles and responsibilities of the new NCM and the existing social worker for the team. Although the NCM would undertake some discharge responsibilities from the social worker, there were other job duties that would be novel, such as assistance with the prior authorization process. After a review of each task around discharge, some clear distinctions emerged. One avenue involved the progression/pacing of care, proactive planning of DME, pharmacy needs, and expectations around discharge and home care. The new NCM would assume responsibility for these areas. The second channel centered around psychological concerns, social determinants of health, and the need to assist families in accessing resources. When no longer contending with physical/medical discharge needs, the social workers were able to focus their time on better meeting these concerns. During the ensuing several months with the different orthopedic provider teams, time was spent observing current processes and seeking out best practices, as there was limited information available in the literature. The NCM partnered with the social worker to gain insight into the prehospital process. Some medically complex patients have protracted preoperative care plans that can start up to 6 months in advance of the planned surgical date and include nutrition, preconditioning therapy sessions to optimize surgical

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healing, and preliminary assessments by therapy services to predict what assistive devices may be needed during the immediate and long-term postoperative course that can start up to 6 months in advance of the planned surgical date. For most orthopedic surgical patients, there is a preoperative discussion or a meeting with a social worker prior to the planned date of surgery. An opportunity existed to more fully clarify the needs for discharge, proactively prepare for them, and initiate key parts of the discharge process well in advance of admission. There were also

weekly preoperative planning meetings for patients who were medically complex and/or were traveling a considerable distance for surgery. Scheduled approximately a month prior to surgery, attendees included therapy services, child life therapists, social workers, and subspecialty-specific providers (cerebral palsy team, skeletal dysplasia team, osteogenesis imperfecta team, scoliosis team, etc.). After participating in both the weekly meetings for some and monthly meetings for others, the NCM was able to identify gaps and work within the team to develop a more formal series of touchpoints with essential assessments to be performed and critical tasks to be completed (see Table 2).

In creating suggested questions for each touchpoint, the team could more fully develop a plan of care that was dynamic. Posing these questions of families offered them the opportunity to discuss realistic expectations for goals of discharge and for home management of the child postdischarge. Transportation

TABLE 2
Touchpoints Across the Pre- to Postoperative Time Frame

Prior to preoperative meeting

Family and child are assessed by orthopedic provider, physical therapist, and, if medically complex, a social worker. Key topics covered:

1. How will the family be travelling to the hospital: car, flight, or medical transport? What support is needed for arrangements?
2. What does the home environment look like: steps, bedrooms, bathrooms?
3. Is there sufficient support for the family in caring for the child (need for home care is investigated)?
4. Social determinants of health are screened, and resources are supplied.
5. Discussion about what "real life" will look like after surgery in terms of mobility, healing, recovery, diet, and pain management.

Preoperative meeting

Multidisciplinary team meeting held to discuss:

1. Transportation to/from hospital.
2. Home layout: stairs, bedroom, bathroom location, indications for DME (wheelchairs, commodes, shower chairs).
3. Connect with family to discuss what "real life" will look like postoperatively.
4. Physical therapy will weigh in on decision points for mobility, weight-bearing activities, needed assistive devices, and how much and how intensive therapy and/or rehabilitation will be.
5. Begin ordering DME, educate families around postoperative appointments needed, how and to what location DME will be delivered.

Day of surgery

1. Different team members connect with family again to ensure that the plan remains the same for each discipline.
2. Based upon changes, each team member adjusts their plan and interventions.
3. NCM assesses likely progression of recovery and how the plan aligns with utilization management criteria.
4. If quick discharge is anticipated, facilitate medication prescriptions being sent to pharmacy to allow time for prior authorization.

Remainder of hospitalization

1. NCM rounds with the APP to discuss plans for feeding advancements, adjustments to medications, and plans for transition from intravenous to oral pain management.
2. NCM confirms with family status of DME order, reinforces education around what to do/whom to contact if needed resources are not in place.
3. Team continues to assess medical necessity and response to treatment plans.
4. If DME is ordered for hospital delivery, NCM ensures that it is delivered.
5. NCM, after review, considers candidates for "Meds to Beds"—outpatient pharmacy fills prescriptions, presents to patient's room for delivery and payment.

Day of discharge

1. Therapy services confirm that patient's balance and mobility meet discharge criteria.
2. NCM meets again with family to communicate all necessary information for discharge.
3. NCM name and contact information is visible on discharge instructions for family, along with provider information.

Postdischarge

1. NCM responds to questions/concerns brought by family around DME, medications, and home nursing.
2. If questions/concerns need to be addressed by provider or therapist, the issue is escalated to appropriate discipline.

Note: APP = advanced practice provider; DME = durable medical equipment; NCM = nurse case manager.

TABLE 3

Average Length of Stay Changes for All Orthopedic Inpatients

Year	Total Admits (n)	Medically Complex (n)	Average Length of Stay (Days)	Percentage of Change	Not Medically Complex (n)	Average Length of Stay (Days)	Percentage of Change
2018	715	447	7.29	n/a	268	3.21	n/a
2019	753	527	7.16	2%	226	2.38	25%
2020	703	490	6.52	9%	213	2.71	14%
2021	689	456	4.98	24%	233	2.14	21%
Change 2018–2021				32%			33%

Note. n/a = not available.

As this process involved additional nurse salaries, there was a need to provide a return on investment for each new role. Length of stay and payer denials formed the basis to calculate significant fiscal impact. The NCM role led to a reduction in length of stay that was sustained over the ensuing years.

may require different accommodations if knees are immobilized or non-weight bearing, situations that the family may not have experienced in the past. Some nonambulating children with cerebral palsy may have a customized wheelchair for regular use. These chairs are individualized and well-designed for enhanced mobility; however these higher technology wheelchairs do not always provide needed support to lower extremities after surgical procedures. Throughout all of these touchpoints, education to the family is provided around the anticipated surgery, expectations, and the opportunity to work with the care team on the plan. Earlier and consistent engagement of the family into planning care was intended to minimize last-minute needs and changes that can delay or stall discharges.

RESULTS

The NCM department was supported by the hospital leadership team and considered integral to the journey toward value-based care. As this process involved additional nurse salaries, there was a need to provide a return on investment for each new role. Length of stay and payer denials formed the basis to calculate significant fiscal impact. The NCM role led to a reduction in length of stay that was sustained over the ensuing years. Medically complex orthopedic

patients often have expected longer lengths of stay and more frequent readmissions than the non-medically complex cohort of patients. Results for non-medically complex children revealed more immediate results as vulnerabilities of the medically complex population are not uniform. Delays due to slower progression of care and meeting other health care needs during the hospitalization required discharge planning to be more flexible and the NCM needed to respond quickly to these changes. Other factors, such as the distance families traveled for care, non-participating insurance carriers, and knowledge of DME vendors for out-of-state patients also affected time to discharge. The NCM advocated for the use of a web-based DME-ordering system that was effective in eliminating many of these issues. There was consistent improvement in length of stay across both orthopedic medically complex and non-medically complex patients over the course of the first 3 years of this role. Also noted was an improvement in the denial rate of patient days over the same time frame. Documentation was improved and enhanced through the education provided by the NCM during rounds, which contributed to the decrease in denials (see Table 3).

During her first year with the team, the NCM identified the lack of wheelchair availability as a cause of some delays in discharge. The NCM worked with

Also noted was an improvement in the denial rate of patient days over the same time frame. Documentation was improved and enhanced through the education provided by the NCM during rounds, which contributed to the decrease in denials.

TABLE 4**Length of Stay for Patients Offered Wheelchair Consignment**

Year	Patients Offered Consignment (n)	Medically Complex Patients (n)	Average Length of Stay (Days)	Non-Medically Complex (n)	Average Length of Stay (Days)
2018	n/a	n/a	n/a	n/a	n/a
2019 (September to December only)	57	27	1.89	30	3.27
2020	205	113	5.04	92	2.95
2021	208	97	6.32	111	3.65

Note. n/a = not available.

As more health systems embrace the tenets of value-based care, it is crucial for hospitals to continue to evaluate processes for opportunities to streamline work, close gaps within workflows and communication channels, and ensure that added positions bring value that is supported by cost savings of these improvements.

the largest group of DME providers to develop a consignment process to have wheelchairs on-site for provision to families when needed. The expectation was that this availability would help reduce the length of stay for patients. Surprisingly, results did not directly prove a decrease in length of stay (see Table 4). Medically complex patients offered consignment may have been given this choice more to ease the challenges of transport to an airport or train than to avoid or circumvent any recognized avoidable delays in discharge. Similarly, those not medically complex had lengths of stay that were appropriate for their diagnosis, surgical procedure, and anticipated course. However, families found this to be a value-added option and voiced satisfaction, especially those who had had previous admissions without the opportunity to receive a wheelchair at discharge. Further study is indicated to assess family satisfaction and what other factors impact length of stay for these patients.

The NCM, through regular rounding and educating providers around criteria for medical necessity, was able to facilitate a reduction in overall denials of patient days within her first year in the role, beginning

in 2018. Continued focus on anticipatory planning and timely progression of care made this progress in overall denials consistent (see Table 5). One patient in 2019 did have an extended stay with multiple socioeconomic barriers that impacted length of stay.

LIMITATIONS

In reviewing the initial years of incorporating a case manager within a busy subspecialized pediatric orthopedic service, several positive outcomes have been shown. There is a continued need to evaluate the touchpoints started here to determine other areas for cost savings and delay preventions. Further in-depth evaluation of the medically complex patient population is indicated to determine where there are more opportunities for improvement in planning and implementing a discharge plan. Family satisfaction should be measured to assess opportunities for continued improvement. Readmissions were not addressed during this initial period but will be highlighted for future study. As our health system has a strong emphasis on family-centered care, a review

TABLE 5**Denials**

Years	Total Patient Days (n)	Total Denied Days (n)	Cost of Denied Days (\$)	Total Denied Days Recovered (n)	Dollars Recovered	Total Denied Days Upheld (n)	Loss of Reimbursement (\$)
2017	2,957	121	740,520	97	593,640	24	146,880
2018	3,267	36	227,448	21	132,678	15	94,770
2019	3,377	73	497,641	36	245,412	37	252,229
2020	2,495	51	357,459	40	280,360	11	77,099
2021	2,114	5	35,970	2	14,388	3	21,582
Total	14,210	286	1,859,038	196	1,266,478	90	592,560

and future study of family education as related to discharge readiness will also be considered.

IMPLICATIONS FOR CASE MANAGEMENT

As more health systems embrace the tenets of value-based care, it is crucial for hospitals to continue to evaluate processes for opportunities to streamline work, close gaps within workflows and communication channels, and ensure that added positions bring value that is supported by cost savings of these improvements. In developing new roles or looking to enhance established ones, a consistent focus on continuous improvement is essential for success. An interdisciplinary approach fosters involvement of all stakeholders and creates mutual goals.

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