Modeling Care Coordination in a Primary Medical & Orthopedic Cerebral Palsy Center

Instructional Course
AACPDM 2018

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What do we already Know?

- Cerebral palsy (CP) is the most common motor disability in childhood.
- Population-based studies from around the world report prevalence estimates of CP ranging from 1.5 to more than 4 per 1,000 live births or children of a defined age range.

About 1 in 323 children has been identified with CP according to estimates from CDC’s Autism and Developmental Disabilities Monitoring (ADDM) Network.

The Agency for Healthcare Quality and Research (AHQR) have cited individuals with disabilities as a population vulnerable to health disparities in their annual disparities report.
Demographics - By Motor Function (GMFCS): Our Outpatient Data

GMFCS Level I
Children walk at home, school, Outside and in the community. They can climb stairs without the use of a rail. Children perform gross motor skills such as running and jumping, but speed, balance and coordination are limited.

GMFCS Level II
Children walk in most settings and climb stairs holding onto a railing. They may experience difficulty walking long distances and balancing on uneven terrain, inclines, in crowded areas or confined spaces. Children may walk with physical assistance, a head-supported mobility device, or on wheels.

GMFCS Level III
Children walk using a head-held mobility device to assist with walking. They may climb stairs holding onto a railing with supervision or assistance. Children use wheeled mobility when walking long distances and may set out to travel greater distances.

GMFCS Level IV
Children use methods of mobility that require physical assistance or powered mobility in most settings. They may require physical assistance or use powered mobility or a body support walker when positioned in a chair, standing and in the community. Children are transported in a manual wheelchair or in powered mobility.

GMFCS Level V
Children are transported in a manual wheelchair in all settings. Children are limited in their ability to maintain anti-gravity head and trunk postures and control leg movements.

(Data from 2006 Autism and Developmental Disabilities Monitoring Network in parentheses)
### Cerebral Palsy: Estimated Medical Cost

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Average medical costs (2005 dollars), per Medicaid-enrolled child, per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neither CP or Intellectual Disability</td>
<td>$1,674</td>
</tr>
<tr>
<td>CP Alone</td>
<td>$15,047</td>
</tr>
<tr>
<td>Both CP and Intellectual Disability</td>
<td>$41,664</td>
</tr>
</tbody>
</table>

- CDC estimated that the combined lifetime costs for all people with CP who were born in 2000 will total $11.5 billion in direct and indirect costs.
Learning Objectives and Session’s Agenda

Part 1
- Background on our Healthcare System
- Background on the disabled population as a Vulnerable Population and Health Inequities in Cerebral Palsy Population
- Understanding Multiple Vulnerability Factors, the Social Determinants of Health, and a Vulnerability Framework Model for the Cerebral Palsy Population (and other CSHCN).
- Care Delivery Models for CP, characteristics of care coordination, and the role of Care Coordination within care models to better care for children with CP.

10 Minute Break

Part 2
- Case Studies and Group Workshop
- Debrief
- Wrap-Up
The Great Paradox: That Exists In Our Current U.S. HealthCare System

- The U.S. is one of the most technologically advanced in Healthcare in the World

  however,

- When it comes to the Delivery of Healthcare, We are one of the worse amongst industrialized nations and the most expensive
The Reality of Our Delivery System for Vulnerable Populations

<table>
<thead>
<tr>
<th></th>
<th>AUS</th>
<th>CAN</th>
<th>FRA</th>
<th>GER</th>
<th>NETH</th>
<th>NZ</th>
<th>NOR</th>
<th>SWE</th>
<th>SWIZ</th>
<th>UK</th>
<th>US</th>
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<tr>
<td><strong>OVERALL RANKING</strong></td>
<td>2</td>
<td>9</td>
<td>10</td>
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<td>3</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>11</td>
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<tr>
<td>Care Process</td>
<td>2</td>
<td>6</td>
<td>9</td>
<td>8</td>
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<td>7</td>
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<td>Access</td>
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<td>5</td>
<td>6</td>
<td>8</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Administrative Efficiency</td>
<td>1</td>
<td>6</td>
<td>11</td>
<td>6</td>
<td>9</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Equity</td>
<td>7</td>
<td>9</td>
<td>10</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Health Care Outcomes</td>
<td>1</td>
<td>9</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: Commonwealth Fund analysis.

**Exhibit 3. Health Care System Performance Scores**

Higher performing:
- UK
- AUS
- NETH

Lower performing:
- NZ
- NOR
- SWIZ
- SWE
- GER

Eleven-country average:
- CAN
- FRA
- US

**Exhibit 5. Health Care System Performance Compared to Spending**

Higher health system performance:
- AUS
- UK

Lower health system performance:
- NZ
- NOR
- SWIZ

Higher health care spending:
- SWE

Lower health care spending:
- CAN
- FRA

US
Equality versus Equity

A) Equality is giving each individual equal resources regardless of need

B) Equity is giving individuals the necessary resources needed to achieve equal outcomes.
The Disabled Population As a Vulnerable population with Poorer health Outcomes

- 4 X more likely to have poor health
- Poor health behavior
- Healthcare access
- Type of insurance
- Preventative care
- Obesity rates
- Smoking rates
- Victim of violent crime/abuse

- Adequate social/emotional health
- Cardiovascular disease
- Newly diagnosed diabetes
- Lower employment
- Lower H.S. education
- Inadequate transportation
- Increased likelihood of < 15,000/yr. income
What Do We Know About Equity Within the CP Population?

- Increase in cerebral palsy (CP) prevalence in non-Hispanic black infants (Van Naarden et al., 2016; Kirby et al. 2011; Wu et. al 2011; Yeargin-Allsopp 2008)

- Disparities found only in those with greater functional limitations with the distribution percentage for severe functional limitations (GMFSC, IV, and V) found to be 70% higher in black children. (Maenner et. al. 2012)

- When both socioeconomic factors and prematurity were controlled for, there was a paradoxical reduced risk in black children, indicating the influence of these factors on CP prevalence (Durkin et. al. 2015).
What Do We Know About Equity Within the CP Population?

- Low versus high socio-economic status was associated with 67% increased risk of developing overall CP and a **93% increased risk of spastic cerebral palsy** (Durkin et. al. 2015).

- Both a decrease in maternal education and neighborhood socio-economic factors were associated with **greater motor functional limitations** in children with CP (Oskoui, 2016).

- Cerebral palsy children with mothers having lower than a high school education had a **three times higher risk of being a GMFCS level 4 or 5** (Oskoui, 2016).
Subgroups Within the Disabled and CSHCN Population

The Disabled Population (15-30% U.S. Population)

CSHCN (15-18% of U.S. children)

CSHCN with Disability and/or Medical Complexity (.4-.7% of US Children)

Children with CP

Largest pediatric population w/ motor disabilities
Background: Overlapping Factors for Vulnerability to Poor Health in Children with CP

- Cerebral Palsy
- Low English Proficiency/Poor health literacy
- Minority Ethnicity/Race
- Low Socio-economic Status
- Poor Healthcare Access

Nemours. Alfred I. duPont Hospital for Children
Children with Special Healthcare Needs (CSHCN) and Recommended Quality Indicators


1. The Family are partners in decision-making

2. Coordinated, ongoing, comprehensive care within a medical home

3. Adequate private and/or public insurance to pay for needed services

4. Screening Early and continuously for special health care needs

5. Organization of Community-Based Service Systems so families can use them Easily (E.G.: Physical Therapy).

6. Receipt of Services necessary for Youth with Special Healthcare Needs to Make Transitions to Adult Healthcare
Quality indicator least achieved was services necessary to make transition into adult health care at only 40%.

A lower percentage of achieving these quality metrics occurred in non-Hispanic blacks, Hispanics, lower family income, and non-English proficient participants.

This disparity is especially present in transition of services to adult healthcare.
Financial Problems for Families with CSHCN
Time Burden in CSHCN (Time spent providing care)
Impact of CSHCN on Parental Employment

No reported impact: 75.0%
Stopped working or cut back on work or both: 25.0%

- Daily activities never affected: 8.0%
- Daily activities moderately affected some of the time: 23.6%
- Daily activities consistently affected, often a great deal: 47.3%

Income brackets:
- 0-99% FPL: 33.1%
- 100-199% FPL: 29.0%
- 200-399% FPL: 22.3%
- 400%+ FPL: 18.0%
The Cycle of Vulnerability in Children/Families with CP (and other CSHCN with physical disability, and medical complexity)

- Children w/ CP have greater barriers to good health/healthcare/health resources
- Greater time in hospital leads to missed time child’s school/parental work
- Lack of or poor health insurance reduces access to primary care, specialty care and ancillary services/equipment
- Untreated problems create further barriers to healthcare, education, employment
- Paternal unemployment/low wage jobs in adulthood less likely to offer health insurance
- Risk Factors and the Cycle of Vulnerability in Children/Families with CP (and other CSHCN with physical disability, and medical complexity)
Vulnerability Framework Model (adapted from Shi and Stevens)

- Need Factors: Individual need factors are specific self-perceived or professionally evaluated illnesses or health needs that drive the need to seek health care and may be described by specific quality measures of the disease and overall quality of life indicators.

- Predisposing Factors: describe the propensity of individuals to use services according to factors such as: age, sex, family size, and social structure variables such as race/ethnicity, education, occupation, and beliefs and values about healthcare. **Not Easily modifiable or only modifiable over time**

- Enabling Factors: are the resources that individuals have available for the use of services such as: income, insurance coverage, and community/regional attributes and are more **modifiable** than predisposing characteristics

- Predisposing, enabling, and need factors interact with one another at both the individual and ecological levels to influence vulnerability.
Vulnerability Framework Model (adapted from Shi and Stevens)
Obtaining Resources to Match Needs

- Insurance dependent
- Geography dependent
- Family Resource Dependent
Example

- A child who is a 12 year old African American Female
- CP, GMFSC 5 seizure disorder, G-tube fed, reactive airway disease, severe scoliosis
- family is socio-economically disadvantaged (an enabling factor which is disproportionately represented amongst racial/ethnic minorities).
- Lack of health insurance),
- Transportation/geographic barriers/mobility/accessibility issues due to disability causing access barriers to specialty healthcare

**The Result:** This child with functional, medical, and social complexity becomes extremely vulnerable to poor health outcomes, including orthopedic surgical outcomes.
Deconstructing Children with Complex Medical and Social Issues into Vulnerability Factors

<table>
<thead>
<tr>
<th>Enabling (modifiable)</th>
<th>Predisposing Factors (not easily modifiable)</th>
<th>Need Factors &amp; Barriers</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomically Disadvantaged</td>
<td>Racial/Ethnic Minority (African American)</td>
<td>Severe Motor Involvement-GMFCs 5</td>
<td></td>
</tr>
<tr>
<td>Lack of health insurance</td>
<td></td>
<td>seizure disorder</td>
<td></td>
</tr>
<tr>
<td>Transportation/geographic barriers</td>
<td></td>
<td>G-tube feeding</td>
<td></td>
</tr>
<tr>
<td>Mobility/Accessibility Barriers</td>
<td></td>
<td>Reactive airway disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe scoliosis</td>
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</tbody>
</table>
The U.S. Department of Health and Human Services in their Healthy People 2010 called for all CSHCN to receive coordinated, ongoing, comprehensive care as a fundamental part of a “medical home”

Care Coordination, What Is It and Why Is It Important?

1) Care coordination for CSHCN is a process that facilitates the linkage of children and their families with appropriate services and resources.

2) A function that helps ensure that the patient’s needs and preferences are met over time with respect to health services and information sharing across people (healthcare team and family), functions, and sites.

3) At a system level, it is the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient’s care to facilitate the appropriate delivery of health care services.
1. A plan of care developed by the physician, practice care coordinator, child and family, other providers, agencies and organizations involved in the child’s care.

2. A centralized confidential record/database of all of the child’s outpatient and inpatient care

3. Information which is shared amongst: the child and family, appropriate medical and surgical specialists, and behavioral/developmental health professionals

4. Families are linked to support groups and other family resources

5. The care coordination physician assists the child/family with understanding clinical issues being managed by subspecialists/consultants.

6. Medical home physician interprets specialists’ recommendations and implements those appropriate for the child

7. A plan of care is coordinated with the educational and community organizations to ensure that the special healthcare needs of the child are addressed
<table>
<thead>
<tr>
<th>Type of Care Delivery Model</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Care Centered Models</td>
<td>defined by the patient centered medical home with primary care directive with care coordination</td>
<td>1. typically geographically closer in proximity to the family’s home, 2. easier travel, access 3. less time and financial burden to the family 4. knowledge and access to community resources</td>
<td>resources and infrastructure may be lacking for care coordination, adequate medical record sharing across systems, and/or an adequate knowledge/skill level to take care of condition-specific problems such as CP may be minimal</td>
</tr>
<tr>
<td>Co-Management Centered Models</td>
<td>1. Usually connected with a tertiary care center such as a children’s hospitals +/- primary care/primary care coordination 2. Specialty care is often consultive only if primary care is sole gatekeeper</td>
<td>May have dedicated resources for the start-up cost of care coordination and electronic medical record systems compared to a primary care centered model, leading to better care coordination and integration.</td>
<td>1. often have a higher service delivery cost 2. stands the risk of the specialist not becoming involved in the care of the patient until the problem has become too advanced with 3. risk for diffusion of responsibility of coordination and integration of care with other specialties and community-based services (i.e. “no captain of the ship”), 4. enrollment criteria within many collaborative care models may leave some subsets of children with unmet medical and technology needs.</td>
</tr>
<tr>
<td>Episode-based Care Models</td>
<td>Primarily occurs within an inpatient facility.</td>
<td>1. effective when acute medical management is required such as the need for around the clock ability to treat the child during their most vulnerable clinical status 2. caretakers who have a high degree of familiarity with the specific condition 3. burden of care provision is removed from the family during this acute episode</td>
<td>1. time and financial burden is often highest for the family due to missed time from work, and time with other children during the acute medical episode of care. 2. has a high cost tag 3. most associated with poor care continuity and coordination with the child’s primary medical provider, and educational and community care teams.</td>
</tr>
</tbody>
</table>
Care Coordination’s Influence on the Social Determinants of Health

World Health Organization (WHO)

Figure 2. Conceptual framework of the social determinants of health

Center for Disease Control (CDC)

SDOH

Economic Stability

Neighborhood and Built Environment

Health and Health Care

Socioeconomic Position

Material Circumstances (Living and Working Conditions, Food Availability, etc.)

Behaviors and Biological Factors

Psychosocial Factors

Social Cohesion & Social Capital

SDOH

Education

Social and Community Context

Source: Solar and Irwin, 2010
GENERAL SOCIAL DETERMINANTS OF HEALTH

Straw Model SDOH

- ADVERSE CHILDHOOD EXPERIENCE
- LANGUAGE/LITERACY BARRIER
- FOOD INSECURITY
- GUARDIANSHIP ISSUES/FOSTER CARE
- HOMELESSNESS/HOUSEHOLD STABILITY
- SCHOOL & EDUCATION BARRIERS
- TRANSPORTATION RELIABILITY

Screening Questions

<table>
<thead>
<tr>
<th>DOMAIN</th>
<th>QUESTION</th>
<th>Response Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Insecurity</td>
<td>Within the past 12 months, have you worried whether your food would run out before you got money to buy more.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Financial Insecurity</td>
<td>Do you have trouble paying for a doctor or for medicines?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Transportation</td>
<td>In the past 12 months, did your child go without medicine or missed a medical appointment because you didn’t have a way to get there?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Utility/Housing</td>
<td>In the past 12 months, has your utility company shut off your service for not paying your bills? (electricity, gas, water, heating/cooling, cable, phone, etc.)</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Housing</td>
<td>In the past 12 months, have you lived in a shelter or had no steady place to sleep at night due to unable to pay rent or house payment? (staying with others or in a hotel, living outside on the street, on a beach, in a car, or in a park)</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Housing</td>
<td>Currently, do you have problems with any of the following in the place you live?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Social Support</td>
<td>Do you have someone you can call when you need help with your child?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Legal Status</td>
<td>Do you have any concerns about your family’s immigration status?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Personal and Family Safety and Stability</td>
<td>Do you or other family members have concerns about personal and family safety? Have you or other family members ever been:</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Neighborhood (or Community)</td>
<td>Do you have concerns about your neighborhood?</td>
<td>Y/N</td>
</tr>
</tbody>
</table>
Social Determinants of Health: Specific to Children with Special Healthcare Needs

Straw Model SDOH

**Built in Environment Accessibility/Mobility Barriers**
- Easy to access community services (e.g.: Therapy services)

**Medical Home and Care Coordination**
- Does your child have easy accessibility in the home environment?
- Does your child have access to services to make transition to adult healthcare?

**Behavioral/Mental Health Needs**
- Is your child frequently depressed, excessively anxious, or talked about suicide?
- Does your child have easy accessibility in his/her Dr’s Office?

**School & Education Barriers**
- Difficulty with Communication

**Selected Screening Questions**

- Do you have easy to access services (e.g.: Physical Therapy) within your community?
- Do you have easy access to a Primary Care Medical Home with Care Coordination?
- Is the medical care of your child a financial burden? (i.e. I can’t pay my bills due to medications and/or hospital costs causing debt) or time burden? (i.e. I can’t hold down a job due to my having to tend to my child’s medical needs)
- Does your child have easy accessibility in his/her Dr’s Office?
SMALL GROUP WORKSHOP
Case 1: 19 yo Hispanic female quadriplegic spastic cerebral palsy with neuromuscular scoliosis

- **MED COMORBITIES**: (+) controlled seizure disorder, Mix pureed oral diet ad lib and supplemental Gtube feeds. (+) slow transit constipation (+)severe intellectual disability. Nonverbal.

- **FUNCTIONAL LEVEL**: GMFCS V and dependent for all care

- **SOCIAL HISTORY**: Lives fulltime in residential pediatric facility with involved 2 parents and siblings. (+) insurance. Reliable transportation during business hours. Medical expense burden for family: Primary and secondary insurance. Non-English Proficient

- **COMMUNITY**: Medical Home: Residential facilities medical director manages all primary care needs, with addition of nutrition. Follows with specialists at Nemours/AIDHC for specialty care. Therapies peripherally involved at facilities

- **SURGICAL PLAN**: posterior spinal fusion with pelvic fixation. Immediate postop: return to sitting and stander device as soon as medically stable
Case 2: DR is a 19 yo African American female with spastic diplegic cerebral palsy and gait issues.

- **FUNCTIONAL LEVEL:** GMFCS II – ambulates independently moderate distances, manual wheelchair for long distance, independent with ADLs

- **MED COMORBITIES:** remote history of seizure, otherwise healthy

- **SOCIAL HISTORY:** lives with mother and teen/young adult siblings in rented 2-story home. Mother not currently working but has own health issues. Plans to start freshman year of college, living in the dormitory, 1-2 months following surgery – shared room, communal bathroom. Does not have own transportation – access to med transport. Medicaid coverage.

- **COMMUNITY:** has PCP near home, specialists at pediatric tertiary care center. No pre-op therapies but available in community.

- **SURGICAL PLAN:** bilateral patellar tendon plication of both patellar tendons, possible bilateral hamstring lengthenings, bilateral bunion deformity correction using proximal metatarsal osteotomy and proximal phalangeal Akin osteotomy. WBAT post-op but knees braced in extension x3-4wks before gradual flexion allowed.
Case 3: VG is a 10 yo African American male with spastic quadriplegic cerebral palsy with neuromuscular scoliosis.

- **FUNCTIONAL LEVEL:** GMFCS V & dependent for all care
- **MED COMORBITIES:** seizure disorder with breakthrough, (+) chronic restrictive lung disease, GJ tube (medications via G, feedings via J), (+) episodes of urine retention with illness. No UTIs in last 12 months & Severe intellectual disability, nonverbal.
- **SOCIAL HISTORY:** Lives at home with parents and younger siblings. X1 sibling with mild autism spectrum disorder. Both parents work hourly, father full time and mother part time as able. Both payed hourly. Attends public school special education program. (+) home nursing care. Medicaid. Variable transportation. Housing stable with some accessibility. (+) refusal of blood transfusion, Jehovah’s Witness.
- **COMMUNITY:** (+) Medical Home: follows with medically complex pediatrician with nurse coordinator who serve as medical home. Receives school based therapies & home nursing agency able to provide home PT and OT as needed
- **SURGICAL PLAN:** Staged posterior spinal fusion in consideration of family’s religious preference to avoid blood products
Case 4: AG is a 13 yo African American male with spastic diplegic cerebral palsy and gait issues.

- **FUNCTIONAL LEVEL:** GMFCS III – ambulates independently with Loftstrands for moderate distances, manual wheelchair for long distance, independent with ADLs

- **MED COMORBITIES:** history of cerebellar astrocytoma as toddler – s/p resection and VP shunt placement; diagnosed with neuromyelitis optica in 2009 – relapse in Feb 2018, currently on rituximab and steroids; blind in right eye with functional vision in the left eye with glasses

- **SOCIAL HISTORY:** lives with parents, siblings in a 2-story home. Extended family nearby. Both parents employed. 2 vehicles. Attends 8th grade – rides bus. Commercial insurance plan through father’s work.

- **COMMUNITY:** has PCP near home, specialists at 2 local pediatric tertiary care centers. Pre-op school PT – outpatient available. Involved in local and church communities near home.

- **SURGICAL PLAN:** bilateral hip reconstruction (VDRO/Dega), bilateral tibial derotational osteotomies, bilateral muscle lengthenings (hip adductor, iliopsoas lengthenings, gracillis, gastrocnemius recessions), bilateral calcaneal lengthenings and bilateral medial column cuneiform lengthenings. NWB x6-8wks post-op in short leg casts.
Components of Multidisciplinary CP Clinic

- Referral
- Telephone Intake
- Development of Plan of care
- Evaluation in Clinic
- Follow up
  - Monitoring
  - Surgical Pathway
Overall Care Coordination Co-Management Structure/Strategy

- Primary Medical Home
- Specialty Medical Care
- Musculoskeletal Care
- Mental and Behavioral Health
- Ancillary Services
- Community Resources
- Social Services

Care Coordinator Role
Inpatient Coordination

Patient and Family

ICU Team

Orthopedic Team

Inpatient Nurse Practitioner

Complex Pediatric Medical Team

Inpatient Nursing Team
From Community to Surgery - The Overall Cycle of Surgical Care
Gains of Multidisciplinary CP Care Coordination Fall 2017-Fall 2018

- Standardized Preoperative Planning for 7 common types of CP surgery
  - Collaborative Quality Project:
    - Orthopedics (surgeons and APPs)
    - Medically Complex Hospitalists
    - Physical Medicine & Rehabilitative Medicine
    - Physical Therapy
    - Nutrition
    - Anesthesia, Urology, Pain team

- Consensus among Medically Complex Hospitalists to supplement as medical home as needed for preop and acute postop period.
BG: 15 yo Caucasian male with hypotonic quadriplegia with neuromuscular scoliosis for posterior spinal fusion

- **Comorbidities**
  - **Strengths:** oral feeder, BMI 30%
  - **Barriers:** CBD oil, oral feeder

- **Functional Level**
  - **Barriers:** Current family routine depends on standing transfers to ease strain of care

- **Social History**
  - **Strengths:** Both parents engaged, Parents relationship is amicable, stable transportation and reliable additional help
  - **Barriers:** Two households not equal in accessibility, Father's income potentially will be negatively effected, in home help not formally trained or has had prior exposure to postop care. Concern stress will strain mom’s ability to cope

- **Community**
  - **Strength:** Access to outpatient therapies
  - **Barriers:** no medical home
Comorbidities
- Hospitalist & Ortho APN work with neuro to wean CBD oil preop and have anticipate plan postop to resume
- Nutrition evaluation and education pre and postop

Functional Level
- Preop educational visit with Acute Care PT, brainstorming session with family

Social History
- Patient will stay at mother’s house first 4-6 weeks at home, parents will alternate.
- Prior to discharge from hospital Inpatient APN has educational phone calls with home aide and acute care PT accesses technology to make educational videos.
- Connect both parents separately to mentors and social work

Community
- Hospitalist acts as medical home for patient for 2 months prior to surgery and 1 month post
- Weekly telephone calls (to each parent) by inpatient APN
Early Results

- Improved access and coordination
- Increased communication
  - With in system and with outside providers
- Improved readmission rates post-op
  - 2015 – 5.7%
  - 2016 – 3.6%

- Decreased cost per patient and cost per admission (Hospital Cost Only)
## Hospital Cost by Procedure

### Spine Procedures

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Costs</th>
<th>Total Direct Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 Median per patient</td>
<td>$79,798.42</td>
<td>$53,779.08</td>
</tr>
<tr>
<td>2016 Median per patient</td>
<td>$55,215.87</td>
<td>$28,670.88</td>
</tr>
<tr>
<td>2017 Median per patient</td>
<td>$66,686.53</td>
<td>$43,957.03</td>
</tr>
</tbody>
</table>

### Hip Procedures

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Costs</th>
<th>Total Direct Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 Median for Hip Procedures</td>
<td>$33,268.79</td>
<td>$21,349.28</td>
</tr>
<tr>
<td>2016 Median for Hip Procedures</td>
<td>$32,309.89</td>
<td>$19,539.22</td>
</tr>
<tr>
<td>2017 Median for Hip Procedures</td>
<td>$38,728.90</td>
<td>$22,946.69</td>
</tr>
</tbody>
</table>
Thank you for your attention
Questions, Thoughts?
Please contact us for questions or further discussion

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