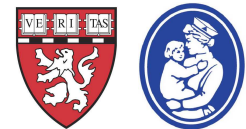


Home Visits After Hospital Discharge for Children with Medical Complexity

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Children with Medical Complexity

Clinical Attributes

- **Chronic condition**
 - Lifelong, life-limiting
 - Affects multiple systems
 - Impairs functioning
- **Serious healthcare needs**
 - Multiple medications
 - Durable medical equipment
- **High resource users**
 - Frequent hospitalizations



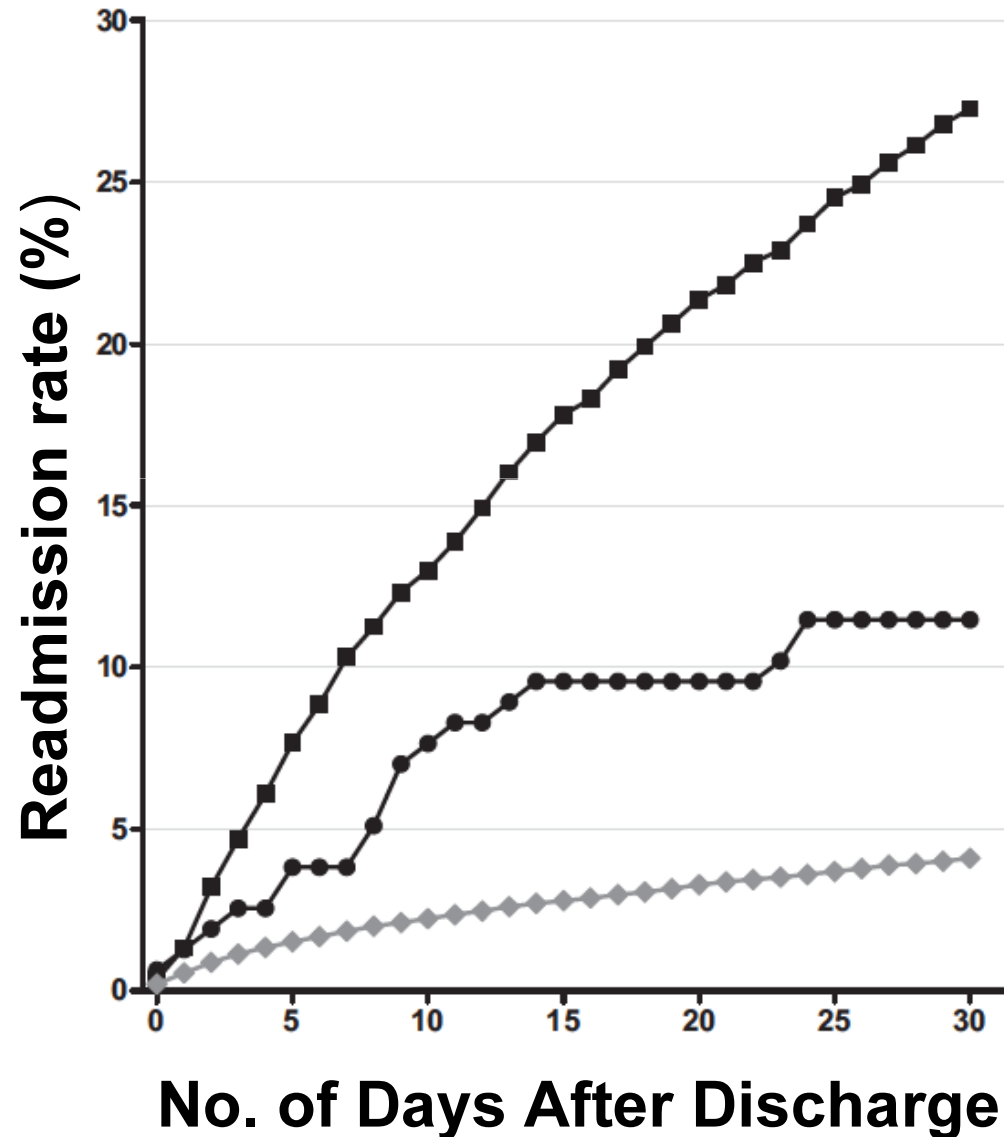
Hospital Discharge

Children with Medical Complexity

- **Challenging and difficult process**
 - Myriad discharge needs
 - Large outpatient care teams
 - Heavy reliance on families
- **Fraught with problems after discharge**
 - Trouble with medications & equipment
 - Difficulties with home caregiving
 - Emergence of new health issues

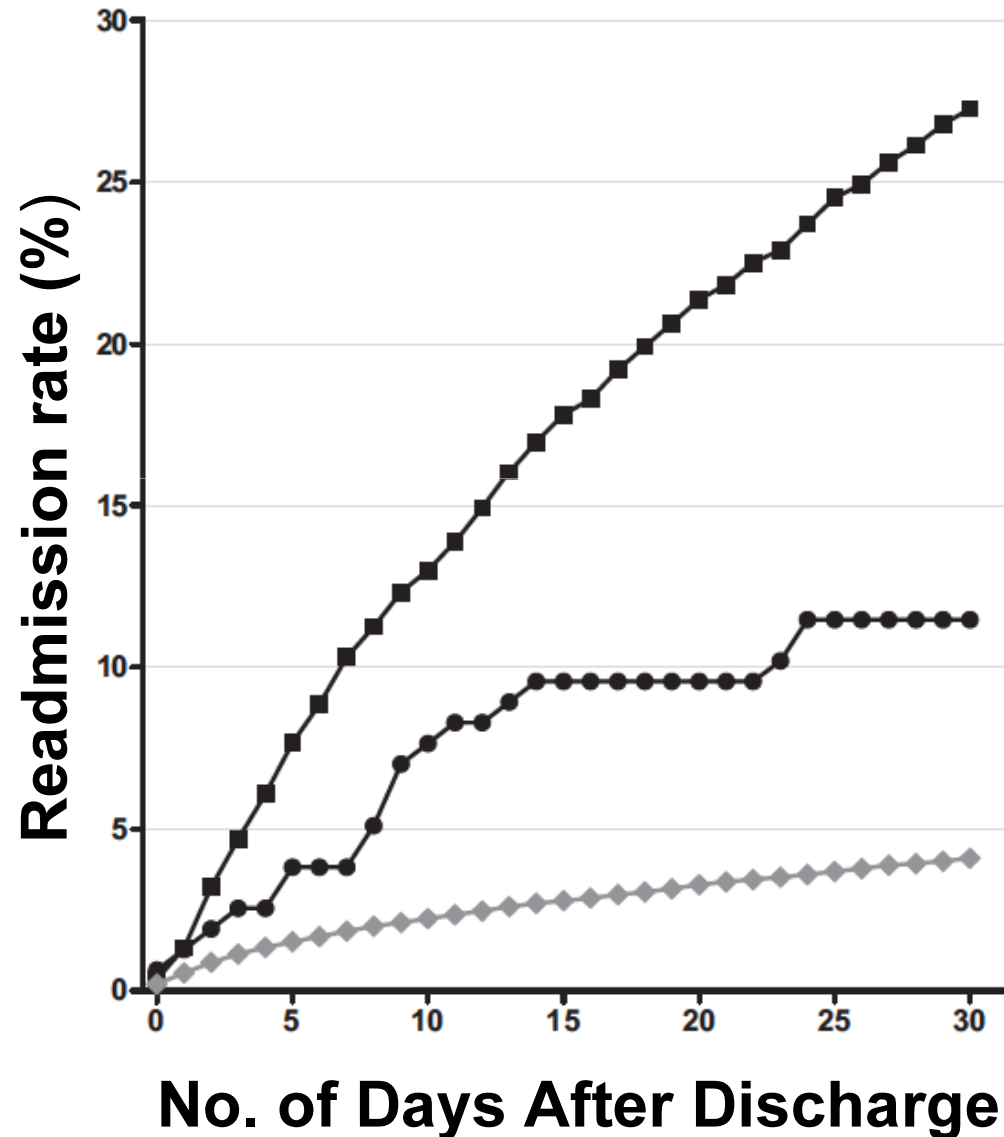
30-day Hospital Readmission Rates

Children with Medical Complexity



30-day Hospital Readmission Rates

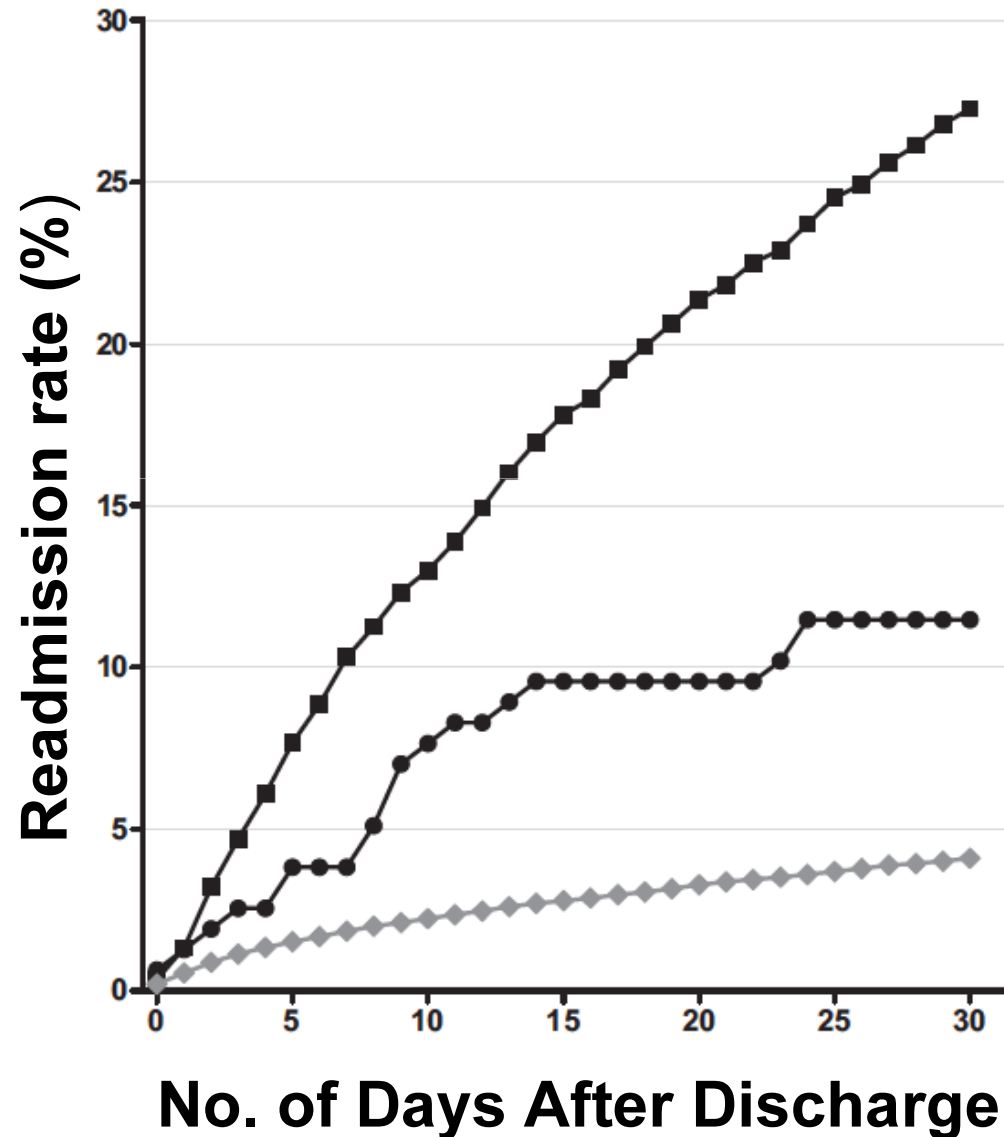
Children with Medical Complexity



Healthy Children

30-day Hospital Readmission Rates

Children with Medical Complexity (CMC)

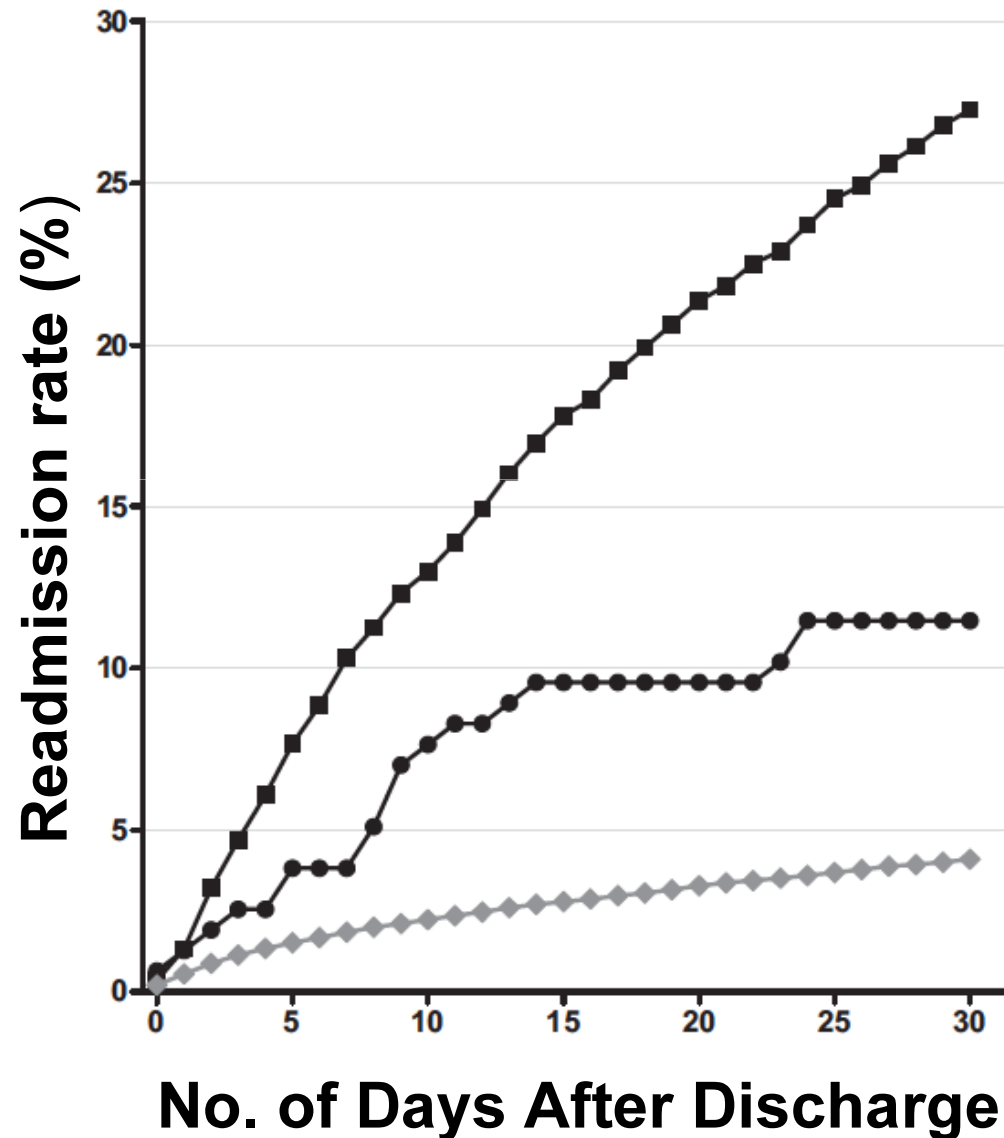


**Children with complex
chronic condition**

Healthy Children

30-day Hospital Readmission Rates

Children with Medical Complexity (CMC)



Children with complex chronic condition and indwelling medical device

Children with complex chronic condition

Healthy Children

Post-Discharge Interventions

Impact on Hospital Readmissions

- **Home visits for adult patients**
 - Help address post-discharge problems
 - Help prevent readmissions
- **Home visits for pediatric patients**
 - Helpful for hospitalized children newly diagnosed with cancer
 - Could be helpful for children with medical complexity after hospital discharge

Objective

To implement and assess the value of post-discharge home visits for recently hospitalized children with medical complexity

Methods

Study Design, Population, and Setting

- **Prospective pilot study**
 - Hospitalized children with medical complexity
 - Boston Children's Hospital
 - April 2015-2019
 - Complex Care Service
 - Dedicated hospitalist service for CMC
 - Staffed with an attending physician, two 2nd year pediatrics residents, a nurse practitioner, social worker, and case manager

Methods

Criteria for Post-Discharge Home Visit

- **Identifying CMC most at-risk for a post-discharge problem**
 - Hospitalization for major operation
 - New chronic diagnosis
 - New technology
 - History of frequent admissions
 - Concerning social/environmental situation

Methods

Post-Discharge Home Visit

- **Goals of Home Visit**
 - Reinforce discharge care plan
 - Identify and address post-discharge issues (*e.g., medications, equipment, environment, social determinants, etc.*)
- **Structure of Home Visit**
 - Conducted by experienced hospital nurse
 - 72-96 hours of hospital discharge
 - 60-90 minutes per visit
 - Follow up with inpatient/outpatient clinicians to address issues

Methods

Process and Outcome Measures

- **Time needed for home visit**
 - Including travel time and record keeping
- **Percentage of visits that identified and addressed a post-discharge problem**
 - Medications, equipment, environment, etc.
- **Perceptions of home visit value and meaningfulness**
 - 30-day readmission rate
 - Parent satisfaction
 - Nursing and hospital staff experiences

Results

Characteristics of the Study Population

121 CMC identified for a home visit

Demographic Characteristics	Finding
Median Age at Admission	6 years
Public Insurance	72%
Median Distance from Hospital to Home	38 miles

Results

Characteristics of the Study Population

121 CMC were identified for a home visit

Clinical Characteristics	Finding
Neuromuscular Chronic Condition	92%
Digestive Chronic Condition	86%
Respiratory Chronic Condition	28%
Indwelling Medical Device	89%

Results

Characteristics of the Study Population

121 CMC were identified for a home visit

Admission Characteristics	Finding
Respiratory Illness	25%
Planned Surgery	22%
Median Length of Stay (in days)	15 days
Median Discharge Medications	10 meds
Median Follow-up Appointments	5 appts

Results

Feasibility of Post-Discharge Home Visits

- In-person time = median 90 minutes
- Transit time = median 73 minutes
- Family present
 - Mother 89%
 - Father 28%
 - Other relative 11%

Results

Utility of Post-Discharge Home Visits

- Problem addressed in 100% of visits
- ≥ 3 problems addressed in 72% of visits
- Problem domains
 - Social/familial 27%
 - Medications 24%
 - Equipment 20%
 - Environment 20%
 - Child's health 9%

Results

Utility of Post-Discharge Home Visits

Social/familial Problems

Characteristics	Finding
Inadequate caregiving support to adhere with the discharge care plan	36%
Financial difficulties that precluded ability to adhere with the discharge care plan	21%

Results

Utility of Post-Discharge Home Visits

Medication Problems

Characteristics	Finding
Caregiving misunderstanding of how to administer a medication	31%
Inability to access a discharge medication due to insurance authorization, omission of prescription, failing to fill a prescription, etc.	21%

Results

Utility of Post-Discharge Home Visits

Environment Problems

Characteristics	Finding
Inadequate disability access in the home	77%
Unsafe sleeping arrangement	23%

Results

Utility of Post-Discharge Home Visits

Child Health Problems

Characteristics	Finding
Unresolved health issues remaining from the hospitalization	85%
Development of new symptoms	15%

Results

Utility of Post-Discharge Home Visits

Equipment Problems

Characteristics	Finding
Incorrect device or supply delivered	30%
Unusable equipment due to malfunction	20%

Results

Equipment Problem

- **Clinical History**
 - Child discharged with a peripherally-inserted central catheter and IV antibiotics for osteomyelitis treatment
- **Home Visit Assessment**
 - Incorrect and inadequate supply of equipment needed for home IV infusion detected by visiting nurse
- **Action**
 - Nurse reported the problem to the DME company, spending 4 hours to ensure that the correct type and amount of equipment were promptly supplied

Results

Value and Meaning of Post-Discharge Home Visits

- **30-day Hospital Readmission Rates***

- Home visit patients = 22%
- Matched controls = 29%

**propensity scored with a greedy matching algorithm on 1:2 ratio of cases to controls on reason for admission, number and type of chronic conditions, age, race/ethnicity, payor, and length of stay*

Results

Value and Meaning of Post-Discharge Home Visits

- Mean family satisfaction rating = 9.5 (out of 10)
- Mean family rating of how well post-discharge problems were addressed = 9.8
- Nurse illustrative quote

“When I am in the home it’s just me, and so it’s quiet and there aren’t people interrupting. Sometimes I can just pick up on things, or being in the home I can look around and think, well that doesn’t look safe or that’s not handicapped accessible and what can we do to make things easier because we have no idea what these kids live in until you walk into their homes.”

Main Findings

Post-Discharge Home Visits

- All home visits successfully identified and addressed post-discharge problems experienced by children with medical complexity and their families
- Most families were receptive to the home visit, reporting positive experiences with a high satisfaction

Limitations

Post-Discharge Home Visits

- Dedicated inpatient complex care service and the experienced home visiting nurse may limit generalizability of the study findings
- Clinical criteria for the home visit may have influenced the findings; less strict criteria may lead to visits that are not association with identification of a problem

Next Steps

Post-Discharge Home Visits

- Train additional hospital personnel to perform home visits
- Spread home visits beyond the dedicated inpatient service for children with medical complexity

Thank you!

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