



# The Impact of Telehealth and Care Coordination on the Number and Type of Clinical Visits for Children With Medical Complexity

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## ABSTRACT

**Introduction:** The purpose of this analysis was to evaluate the effects of an advanced practice nurse–delivered telehealth intervention on health care use by children with medical complexity (CMC). Because CMC account for a large share of health care use costs, finding effective ways to care for them is an important challenge requiring exploration.

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**Method:** This was a secondary analysis of data from a randomized clinical trial with a control group and two intervention groups. The focus of the analysis was planned and unplanned clinical and therapy visits by CMC over a 30-month data collection period. Nonparametric tests were used to compare visit counts among and within the three groups.

**Results:** The number of unplanned visits decreased over time across all groups, with the greatest decrease in the video telehealth intervention group. Planned visits were higher in the video telehealth group across all time periods.

**Discussion:** Advanced practice registered nurse–delivered telehealth care coordination may support a shift from unplanned to planned health care service use among CMC. *J Pediatr Health Care.* (2017) 31, 452-458.

## KEY WORDS

Care coordination, medical complexity, telehealth

Children with medical complexity (CMC) are an important clinical population to study given their high health care use patterns. Common conditions affecting CMC include congenital or acquired multisystem conditions, cancer, or cancer in remission, with ongoing disability in multiple areas and severe neurologic conditions with marked functional impairment (Cohen et al., 2011). Children with certain chronic conditions have been shown to incur medical care costs 2.5 to 20 times higher than children in general in the United States, and in 2009 CMC accounted for \$9.2 billion of U.S. hospital charges (Berry, Agrawal, Cohen, & Kuo, 2013; Ireys, Anderson, Shaffer, & Neff, 1997). In fact, 20% of all U.S. children who use medical services have been shown to incur about 80% of all children's

health care expenditures (Simon, Berry, Feudtner, & Stone, 2010). CMC tend to have the most intensive health care needs and to be the most medically fragile (Hudson, 2013). Advances in health care have led to an increasing number of CMC surviving longer, so the relative medical complexity of hospitalized pediatric patients has increased over the past 15 years (Burns et al., 2010). Therefore, finding efficient ways to deliver the highest quality care to this high-need population is an important challenge in health care today.

The pediatric health care home model of care is advocated for children and youth with special health care needs, of which CMC are a subset; in this model, each family has an ongoing relationship with a primary health care provider, and care is coordinated using a team-based model (Turchi, et al., 2014). Although there are no current standards for the educational preparation or core functions of the care coordinator in the health care home (McAllister, Presler, & Cooley, 2007; Wise, Huffman, & Brat, 2007), improved outcomes for children have been shown in studies of advanced practice registered nurse (APRN)-delivered care coordination within the health care home (Cady et al., 2015; Looman, et al., 2015; National Association of Pediatric Nurse Practitioners, 2015). The TeleFamilies study examined the effectiveness of an APRN in an established health care home setting coordinating the care of CMC using telehealth technology compared with usual care and telephone triage. The primary goal of this analysis was to determine whether the intervention decreased the number of unplanned clinical visits and whether the availability of video telehealth technology was more effective than telephone-only telehealth technology.

## METHODS

### Design

The focus of this study was a subset of data from the TeleFamilies Project. The TeleFamilies Project, funded by National Institutes of Health grant R01NR01883 from the National Institute of Nursing Research, was a three-armed randomized controlled trial (RCT) with a baseline study period of 6 months after enrollment followed by the intervention period of 2 years. The control group receiving traditional health care home coordination was compared with two APRN telehealth care coordination intervention groups. One intervention group used telephone communication with the APRN (telephone group), and the other used telephone plus video communication with the APRN (video group).

### Sample

The sample was identified by using the Children with Special Health Care Needs (CSHCN) screener (Bethell et al., 2002) applied to patients receiving care at the special needs clinic of a large, urban, general pediatrics clinic affiliated with a nonprofit children's hospital. Eligi-

bility for the TeleFamilies Project was defined as meeting four of the five CSHCN screener criteria: need for prescription medication, need for medical care, functional limitation, and need for special therapies for at least 12 months. The need or use of mental health counseling was the optional fifth criterion. This was the most commonly used CMC identification method at the time of study initiation; all TeleFamilies subjects also meet current CMC criteria (Cohen et al., 2012). The minimum age at enrollment was 2 years old to exclude infants who outgrow their conditions; the maximum age was 15 years at enrollment to ensure eligibility for pediatric care through 30 months of enrollment in the study.

All subjects were randomly assigned with three age stratifications (2–5, 6–12, and 13–15 years old) to one of the three groups, and at the conclusion of the 6-month baseline period they began the 2-year RCT period. There were 163 subjects enrolled in the TeleFamilies Project, with 55 subjects randomized into the control group, 54 in the telephone group, and 54 in the video group. Those agreeing to participate provided written informed consent, following the guidelines of the institutional review boards. Subjects who did not complete the study because of voluntary withdrawal or death during the study were not included in the analysis, leaving a total of 148 subjects with 47 in the control group, 50 in the telephone group, and 51 in the video group.

### Setting

For a 6-month baseline period, all subjects received the traditional health care home model of primary care provider (PCP)-coordinated care. Within this model the PCP manages overall care, delegating follow-up and coordination tasks to the care coordination team as needed. In the clinic where TeleFamilies was conducted, this team included a half-time medical assistant care coordinator and telephone triage provided by registered nurses. After-hours and weekend telephone triage was handled by an offsite service. All control group subjects continued to receive this model of care coordination throughout the 2-year intervention period.

### APRN Telehealth Care Coordination Intervention

For intervention group subjects, the PCP continued to direct overall care. What changed was the addition of a single full-time APRN care coordinator who managed follow-up and coordination of each child's care during and between clinic visits. The APRN was an experienced certified pediatric nurse practitioner who provided relationship-based care coordination, increasing the "nurse dose" available to intervention families (Looman et al., 2013) via telehealth.

As each family was randomized to an intervention group, the APRN initiated relationship-based care coordination via telehealth. The APRN explained her role and began developing a plan of care in partnership with the

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