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THE IN-HOME HOSPITAL-LEVEL CARE EXPERIMENT: IN ROCHESTER, NEW YORK

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EXECUTIVE SUMMARY

RANDOMIZED TRIAL OF HOME NURSING TO REPLACE INPATIENT CARE FOR COMMON ACUTE PEDIATRIC PROBLEMS

Statement of the Problem

Hospitalization reflects serious morbidity, has adverse psychosocial effects, and accounts for almost half of child health expenses. In-Home Hospital-level Care (IHHC) is an organizational innovation designed to replace a large proportion of traditional inpatient care. Attributes include one-to-one nursing, in-home services otherwise comparable to hospital services, and rapid accessibility for families with an ill child in the emergency department or a physician's office.

Research Objective

To assess the hypotheses that IHHC is equally safe and effective, less burdensome to families, and less expensive for care of common acute pediatric problems now managed with hospitalization.

Study Design and Methods

A randomized trial compared health care systems with and without IHHC. Eligible children (1) presented to the Emergency Department of our medical center, (2) had common acute problems, and (3) were considered for hospital admission at initial physician evaluation. Unlike most randomized trials, which are conducted in a controlled setting and allow a high level of investigator control over experimental conditions, the IHHC trial was conducted in a true community setting. Success in completing the trial required cooperation from a hospital, insurance organizations and nursing services in addition to families and physicians.

Physicians decided disposition from the emergency department. For experimental subjects (cases), they chose among hospital care, IHHC, and family home care. For control subjects (controls), they chose hospital care or family home care. Non-random controls, defined as children eligible for randomization who were hospitalized at times when randomization was precluded by lack of IHHC nurses, were also studied. Note that subjects were not randomized directly to IHHC or not, but to a system of care that either included IHHC or did not. To allow best use of scarce home nursing resources, we used disproportionate selection favoring the system with IHHC.

Quality measures included adverse events, parent anxiety and satisfaction with care, family disruption, and perceived child health. Enrollment, which ran from February 1, 1999 through August 30, 2000, included 180 randomized subjects (131 cases, 49 controls) and 72 non-random controls. 57 children received IHHC, including 56

randomized subjects and 1 non-randomized subject (twin of a randomized subject who received IHHC).

Findings

Enrollment fell short of goals primarily because of resistance by hospital administration. Cases and controls were demographically and clinically comparable. In the trial, 21.4% of cases and 20.4% of controls received only family home care. Intent-to-treat analysis of 4 consecutive daily parent reports during the index episode revealed statistically significant differences, favoring cases, that began, for most measures, with the day after presentation. From this time onward, scales based on parent reports revealed among cases less overall family disruption (including both less impact on the mother and less impact on other family members) and more positive parent mood. Similarly, on a single item in which parents rated their day (from awful to excellent), case parents reported better days from day 2 onward. Parent perception of vulnerability at time of presentation, parent reports of illness-related behavior and sickness ratings on the 4-day diaries, physiologic measures of severity, and the distribution of diagnoses revealed no differences between cases and controls. Mean time spent in the emergency department for cases and controls (6.32 and 5.64 hours, respectively) was similar, whereas the mean total time away from home for controls was twice that for cases (49.4 vs. 24.7 hours). The mean time away from home for children cared for with IHHC was 7.4 hours (the time spent in the emergency department) compared to 58.8 hours for children hospitalized. One child admitted to IHHC was later hospitalized because of concern about clinical deterioration but recovered uneventfully. *No child* who experienced IHHC had an adverse outcome or complication of treatment during the index illness episode. Most families and clinicians favored IHHC.

At 2 weeks following enrollment, parent mood remained more positive for case parents. Other measures at 2 weeks, including reported distress in the child and in the mother, satisfaction with nursing care for the child and satisfaction with nursing care for the family, revealed no differences in intent-to-treat analysis. Analysis was also performed on subjects remaining after removing children managed with family home care only, i.e., after removing subjects that received neither IHHC or inpatient nursing care. In this analysis, satisfaction with nursing care for the family and nursing care for the child favored cases ($P = .065$ and $P = .011$, respectively).

Two months after enrollment, no statistically significant differences were observed for caregiver worries, caregiver competence, perceived child vulnerability, change in perceived vulnerability nor caregiver's physical symptoms. The later 2 measures approached significance, however, in favoring cases ($P = .142$ and $P = .163$, respectively). No differences in health services utilization were observed over a 6-month period following enrollment.

Economic analysis of the index illness episode from a societal perspective, in which parent time was considered at \$20 per hour and subjects managed only with family care were ignored, demonstrated a statistically significant ($P = .037$) and financially important (\$896 per illness episode) advantage for the experimental group. Ignoring parent time, there was no significant difference in cost between experimental and control

subjects. Children managed with IHHC accrued lower costs (difference = \$486, P = .020, one tailed) than children hospitalized, ignoring time costs. This difference became much larger when time costs were considered (difference = \$1544, P = .000, one tailed).

Conclusions and Recommendations

In the healthcare market, IHHC represents an organizational innovation that appears to deliver a more valuable service at lower cost. Feasibility, acceptability and acceptance of IHHC by various stakeholders has been established. Acceptance at the community level, which constitutes success in the marketplace, is not addressed by this project because our experience at this level represents a single case study. Adoption by hospitals and insurers is an institutional management and political decision, and cannot be predicted from this study. Resistance from hospitals can be anticipated (and was observed) with organizational architecture and financing in which IHHC reduces hospital revenue.

IHHC represents an organizational innovation that adds value to the health care system as a whole. We identify strategies that allow substantial portions of this value to be captured and distributed among stakeholders with dominant decision rights, as well as among those with less influence, in a way that will allow the innovation to move forward. Insurance organizations and hospital incentives are aligned in finding alternatives to regular inpatient care for low-profit DRGs. If these dominant institutions can be assured of physician cooperation, it can be anticipated that they will ultimately be able to negotiate contracts between themselves that will allow this alternative to emerge as a prevailing health services model. Consequently, it is in their best interest, and in the interest of Federal agencies charged with promoting high-quality, low-cost care (e.g., Maternal and Child Health Bureau, National Institute of Nursing Research, Agency for Healthcare Research and Quality) and training (e.g., Bureau of Health Manpower, Health Resources and Services Administration) to support initiatives such as the following.

- Train more nurses and include training for home-hospital care.
- Develop nursing organizations with the capacity (1) to provide nurses who can function well across a broad spectrum of settings, including home as well as hospital; (2) to offer flexible levels of staffing; and (3) to provide rapid response (<60 min) to requests for IHHC nursing.
- Train physicians to identify illness episodes eligible for home-hospital, to work collaboratively to care for patients in this setting.
- Reimburse physicians in a way that provides compelling incentives to use this alternative
- Support health services research that provides firm evidence to identify eligible illness episodes.
- Support health services research that facilitates expanded use of information technology (e.g., telemedicine) in IHHC.

Natural extensions of IHHC – for example, to care for common adult medical illness (e.g., deep vein thrombosis, community-acquired pneumonia, asthma exacerbation), shortening hospital stays for neonatal intensive care unit survivors, earlier discharge of other children and adults, and post-operative care – heighten the significance

of the IHHC model for the marketplace. With surging healthcare spendingⁱ in an increasingly competitive marketplace, dominant stakeholders (e.g., medical centers, insurers, physician organizations, industry) have strong incentives relating to IHHC. Incentives of dominant stakeholders may conflict in the short term. Hospitals receiving event-based reimbursement, for example, seek to maximize occupancy and minimize length of stay, whereas insurance organizations seek to minimize hospitalization rates for covered lives. This circumstance prevailed in this community during the short period of the IHHC trial. We had expected that integrated delivery systems, which were widely anticipated at the time the IHHC trial was designed and funded, would align financial incentives and drive the adoption of IHHC. Integrated delivery systems failed to develop locally.

The increased value and cost reduction proffered by innovations like IHHC will not come easily. Each dominant stakeholder retains sufficient power to prevent adoption. Adoption may require restructuring of healthcare financing so the financial position of no dominant stakeholder is seriously threatened. Meeting this challenge will most likely require political solutions at both federal and local levels.

LIST OF PRODUCTS

Abstracts:

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