



Youth Repeatedly Hospitalized for DKA: Proof of Concept for Novel Interventions in Children's Healthcare (NICH)

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Diabetic ketoacidosis (DKA) is the most common reason for hospitalization of youth with type 1 diabetes. The annual cost of care for youth with type 1 diabetes with and without DKA was estimated to be \$14,236 and \$8,398, respectively (1). There appears to be a subgroup of youth with type 1 diabetes that encounters many psychosocial challenges that put them at risk for repeated hospitalizations for DKA. With intervention, these DKA-related hospitalizations may be avoidable. Thus, consistent with the triple aim of health care reform (i.e., reducing costs, improving health, and improving care) (2), Novel Interventions in Children's Healthcare (NICH) was developed to address the triple aim in youth with type 1 diabetes (3).

NICH is theoretically grounded in Urie Bronfenbrenner's (4) social ecological theory of human development. Bronfenbrenner's theory conceptualizes youth development through the multiple systems (e.g., family, school, hospitals) that directly and indirectly affect youth health. Interventions are implemented across the many contexts in which youth are embedded. The foundation for NICH is comprised of three interrelated components of health care delivery. First, NICH involves an intensive form of Behavioral Family Systems Therapy (BFST) (5). BFST addresses obstacles to health behaviors by using a combination of family-based and skills-based interventions. BFST has been shown to be effective in directly

and indirectly improving adherence and metabolic control in youth with type 1 diabetes (5). Second, NICH involves the delivery of care coordination to facilitate successful collaboration between the multiple medical providers and youth/family to improve health care delivery. NICH providers serve as liaisons among youth, family, and medical teams to enhance communication, treatment adherence, and collaborative problem solving (as needed around the treatment regimen). Third, all families participating in NICH receive some level of case management related to the multiple social systems in which youth are embedded. More specifically, NICH interventionists interact with schools, child protective services, and the other agencies (e.g., juvenile office personnel, employers) that are directly involved with youth and family, as well as community agencies and any other organizations that may provide useful resources. Taken together, NICH interventionists deliver a combination of an intensive form of BFST, care coordination, and case management within the youth's natural environment and adapt these services to the specific needs of youth and families served (Fig. 1). NICH interventionists are Master's-level professionals trained extensively in diabetes in youth.

Currently, there are 25 youth with type 1 diabetes who are either currently enrolled in NICH or have completed treatment. The majority are adolescents, have had type 1 diabetes for more than 5 years,

and have had three to nine hospitalizations for DKA within the past year. Anecdotally, the interventionists were able to identify the drivers of repeated DKAs in each of the youth and corrective action was taken. Based on preliminary data, NICH represents a promising intervention in reducing health care costs, improving health, and improving care for a subgroup of youth with type 1 diabetes who are repeatedly hospitalized for DKA.

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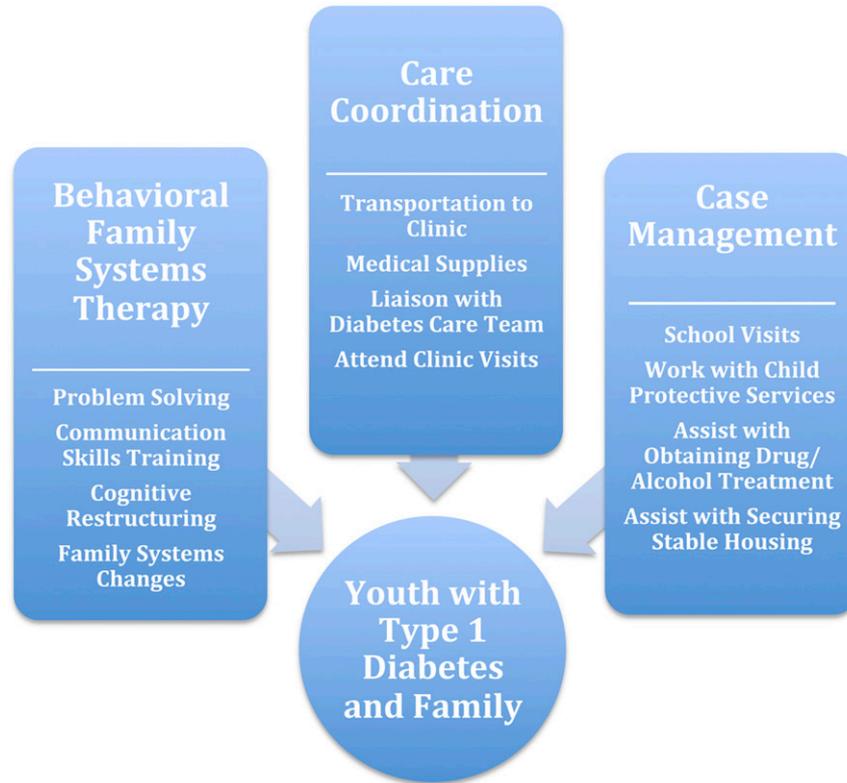


Figure 1—NICH intervention model.

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