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Residency Education in

Preparing Adolescents and Young Adults for Transition to Adult Care:

A Mixed Methods Pilot Study

by

Janet S. Hess

A dissertation proposal submitted in partial fulfillment
of the requirements for the degree of
Doctor of Public Health
College of Public Health, Community and Family Health
University of South Florida

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Dedication

To my daughters, Hayley, who led me to this field and inspires me with her spirit and enthusiasm for life, and Maddie, for her compassion, strength, and independence.

To my husband, Steve, whose love and support has allowed me to pursue my life goals.

To my parents, Lois Shively, for her generosity, kindness and selflessness, and John Shively, for his commitment to excellence and passion for lifelong learning.
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Abstract

Background

There is considerable evidence that physicians lack sufficient training in facilitating transition from pediatric to adult care systems for adolescents and young adults (A/YA). While several primary care residency programs have introduced health care transition (HCT) curricula in recent years, there are few studies that assess the effectiveness of HCT teaching models.

Purpose

To assess the impact of a residency education program that uses electronic health records (EHR) and other methods to teach residents how to prepare A/YA for transition to adult care.

Methods

In a mixed methods, quasi-experimental research design, quantitative methods were used to measure change in knowledge, confidence and experience among 67 Pediatrics and Med-Peds residents who participated in the program. All residents and a comparison group were invited to complete a 35-item pre/post-survey; a retrospective chart review provided documentation of age-specific HCT preparation tasks completed by residents during well visits for A/YA aged 12-21. Descriptive and correlational analyses were conducted to compare differences between resident and control test scores for 5 outcome variables, and to measure resident utilization of the HCT tool in the EHR. Using the Reach Effectiveness-Adoption Implementation Maintenance (RE-AIM) evaluation model as a guide, semi-structured interviews were conducted concurrently with residents and faculty to assess program acceptability, feasibility, and other important attributes. Interviews were transcribed and analyzed using a constant comparative, iterative process.
Results

Survey results showed residents (11 matched pairs) scored significantly higher than controls (13 matched pairs) in 2 of 5 outcomes: exposure to HCT learning activities \((p=.0005)\) and confidence in providing primary care for YSHCN \((p=.0377)\). Overall utilization of the EHR tool among 51 residents was 52.8% (57 of 108 patient visits). In interviews conducted with 16 residents and 6 faculty, both groups said that HCT training is a highly relevant need. Residents said they had little knowledge or experience in HCT prior to the intervention but felt more confident in their abilities afterwards. The HCT tool in the EHR was the only intervention element among multiple modalities that reached all study participants, with more than 80% of residents interviewed reporting they used the HCT tool “usually” or “always.” Factors that influenced program adoption included accessibility of educational materials, ease of use, time constraints, patient age and health condition, and attending physicians’ enforcement of the protocol.

Conclusion

This study contributes to the body of knowledge concerning HCT by increasing our understanding of ways to effectively educate residents about transition preparation. Results show a positive intervention effect on selected dimensions of resident knowledge, confidence, and practice in HCT, highlighting program strengths and weaknesses. The program is distinctive in educating residents to prepare all A/YA for HCT, as recommended by major medical associations for pediatric and adult care physicians, and in its use of the EHR as a primary teaching tool, a consideration for reducing time-intensive didactic instruction. It provides a model that can be adapted by other residency and provider training programs, and suggests a need to integrate acquisition of health care self-management skills more broadly in child and adolescent health preventive care tools and policies.
Chapter 1. Introduction

Background

The Maternal and Child Health Bureau (MCHB) defines children and youth with special health care needs (C/YSHCN) as those “who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally.”\textsuperscript{1(p137)} It is estimated that 10.2 million C/YSHCN from birth to age 17 currently reside in the U.S.\textsuperscript{2} The proportion of C/YSHCN increases dramatically with age: approximately 9\% of children under age 6 have special health needs, but the proportion almost doubles, to about 17\% for those ages 12 to 17 years.\textsuperscript{2} The large and growing number of adolescents and young adults (A/YA) with chronic health conditions and disabilities is a result of advances in treatment (e.g. pharmacology, surgical techniques, medical technology) that have been made over the last three decades. Today, about 90\% of children with conditions which were previously fatal in childhood are surviving into adulthood.\textsuperscript{3}

While many of these young people will move smoothly into adulthood, others will have difficulty transitioning to independence and autonomy without assistance.\textsuperscript{4} Transitions may include movement from a family home to living alone or with peers; from high school to postsecondary education or work; and from pediatric to adult health services.\textsuperscript{5} Blum et al. are credited with defining health care transition (HCT) in 1993 as “the purposeful, planned movement of adolescents and young adults with chronic physical and medical conditions from child-centered to adult-oriented health care systems.”\textsuperscript{6 (p578)} Despite a general understanding among health care professionals about the value of providing an uninterrupted “hand-off” from
pediatric to adult care, recent data show that only about 40% of YSHCN aged 12 to 17 are adequately prepared for transition to adult systems of care.\textsuperscript{2}

By current estimates, 15-20\% of 20 million A/YA with SHCN people aged 14 to 26 living in the U.S. have needs that necessitate utilization of health care services across the lifespan at much higher rates than the general population.\textsuperscript{7,8} For this population, access to appropriate, affordable adult care is critical yet problematic. Factors that interfere with smooth HCT are numerous and well documented: \textsuperscript{9-14} A/YA with SHCN have difficulty finding adult providers who receive training in childhood-onset diseases, or who take Medicaid or Medicare; they have problems securing adequate insurance coverage after they age out of childhood plans; they are not adequately prepared to assume responsibility for managing their own health care; and there is no systematic linkage between pediatric and adult medical systems to guide them. Without ongoing care, A/YA with SHCN are likely to experience disease complications, increased emergency room visits and hospitalizations, and development of secondary disabling conditions.

Over the last 20 years, numerous professional organizations have responded to this emerging health care system problem by issuing policy and position statements about the need for transition services.\textsuperscript{15,16} In 2001, the MCHB identified HCT as one of 6 core outcomes for improving care for C/YSHCN: all YSHCN will receive the services necessary to make transitions to adult life.\textsuperscript{17} In 2010, MCHB’s operational measure – transition preparation – was used to develop a new Healthy People 2020 (HP 2020) objective “to increase the proportion of youth with special health care needs whose health care provider has discussed transition planning from pediatric to adult health care.”\textsuperscript{8} A clinical report released in 2011 by the American Academy of Pediatrics (AAP), American Academy of Family Physicians (AAFP), and American College of Physicians (ACP) outlined guidelines to transition all A/YA to an adult model of care, not just those with chronic health conditions.\textsuperscript{18} These events highlight the need to develop a
competent, knowledgeable health care workforce that is trained to facilitate HCT, particularly in light of MCHB data showing the majority of YSHCN are unprepared to move to adult health care systems.²

**Research Gap**

The introduction of the HP 2020 HCT objective⁸ and the new clinical report¹⁸ reflect increasing public recognition of the importance of health care transition as well as a shift in its conceptualization within the health care community. The report, entitled “Supporting the Health Care Transition from Adolescence to Adulthood in the Medical Home,” provides detailed guidance for transition preparation, planning, and implementation within a medical home. A cornerstone of the new algorithm is that A/YA, as developmentally able, should be introduced to an adult model of care beginning in early adolescence (e.g., encouraging self-management skills, involvement in health care decision-making, speaking to physician alone), regardless of provider type (e.g., pediatrician, Med-Peds, family practitioner, subspecialist). By age 18, the adolescent should be fully transitioned to the adult care model; transfer to an adult provider, if needed, ideally occurs between ages 18 to 21.

The report lays out clear steps for HCT timing and interventions for both pediatric and adult medical homes. Use of electronic health records (EHR) and other information technology is a critical component of the new guidelines. The MCHB-funded National Center for Health Care Transition (National Center) subsequently developed a corresponding set of tools to document and support transitional care processes.¹⁹,²⁰ Primary care and subspecialty providers are encouraged to adapt the instruments to fit the unique needs and requirements of their own practices.

The report also identifies the education of practicing physicians and physicians in training physicians as essential for the integration of HCT principles and processes. Indeed, while graduate medical education (GME) in HCT has been identified elsewhere as an important area of need,²¹-²³
there currently are few studies concerning effective GME models, and no published studies of residency programs that have incorporated the new clinical guidelines.

Consequently, the Department of Pediatrics in the Morsani College of Medicine at the University of South Florida Health (USF Health) proposed the development of an educational model for Pediatrics and Med-Peds residents (Med-Peds programs train doctors to be board certified in both Internal Medicine and Pediatrics) that emphasizes the use of EHR and information technology as teaching tools for the new guidelines.

**Purpose Statement**

The purpose of this dissertation was to assess, using a concurrent mixed methods research design, impact of USF Health’s HCT residency education program. In the study, self-report survey data from residents and a comparison group, along with data from patient chart reviews, were used to measure intervention effect on resident knowledge, confidence, and physician-patient interactions. In-depth interviews with residents and physician faculty were used to gain insights about how HCT is perceived, acceptability and feasibility of the intervention, and ways to improve the model. By converging both quantitative and qualitative data, then comparing and triangulating the data in interpreting results, this approach provided a more comprehensive understanding of ways to effectively integrate HCT concepts and processes into residency education.

**Research Questions**

1. To what extent did the intervention facilitate change in resident knowledge, confidence and experience in HCT?
2. Were there differences in change among subgroups, e.g., Pediatrics versus Med-Peds program, year of residency? What factors influenced change?
3. How did residents and faculty perceive HCT?
4. What were the perceived value, relevance, and acceptability of the intervention?
5. How can the model be improved?

**Theoretical Underpinnings**

Multiple learning and behavior change constructs were used to develop both the intervention and research objectives, and subsequently guided interpretation of data results. The logic model in Table 1 frames key components of the program, including short-term impact goals for the study as well as long-term outcome and public health goals. Key theories and principles used throughout the study are described below.

**Ecological Perspective**

The ecological perspective\(^2\) emphasizes the interaction between, and interdependence of, factors within and across all levels of a health problem. It highlights people’s interactions with their physical and socio-cultural environments. Two key concepts of the ecological perspective are that behavior both affects, and is affected by, multiple levels of influence; second, individual behavior both shapes, and is shaped by, the social environment (reciprocal causation).

To explain the concept of multiple levels of influence, McLeroy and colleagues\(^2\) identified 5 levels of influence for health-related behaviors and conditions: (1) intrapersonal or individual factors; (2) interpersonal factors; (3) institutional or organizational factors; (4) community factors; and (5) public policy factors. At the individual and interpersonal levels, contemporary theories of health behavior can be broadly categorized as “Cognitive-Behavioral.”\(^2\) Key concepts that cut across these theories are:

- Behavior is mediated by cognitions, i.e., what people know and think affects how they act.
- Knowledge is necessary for, but not sufficient to produce, most behavior changes.
• Perceptions, motivations, skills, and the environment are key influences on behavior.

An ecological perspective shows the advantages of multilevel interventions that combine behavioral and environmental components. The theoretical framework developed for the study draws primarily from the first 3 levels of influence – individual (intrapersonal factors associated with residents), interpersonal (resident relationships with peers, faculty) and organizational (USF Health). Important theoretical constructs and concepts from each of these three levels are outlined in the following sections.

**Individual Level: Theory of Planned Behavior**

Ajzen’s\textsuperscript{26} Theory of Planned Behavior (TPB) links attitude and behavior by postulating that intention, the most proximal determinant of behavior, is determined by three conceptually independent constructs: attitude, subjective norms, and perceived behavioral control. TPB describes attitude as a disposition to respond favorably or unfavorably to a behavior, object, person, event, or institution. Attitude is determined by an individual’s beliefs about the behavior, object, etc.

The construct of perceived social expectation (subjective norms) is a function of beliefs that specific, important people approve or disapprove of performing the behavior; it is weighted by the individual’s motivation to comply with the person/group. Perceived behavioral control is similar to Bandura’s\textsuperscript{27} construct of self-efficacy; that is, an individual's perceived ease or difficulty of performing a particular behavior. As a general rule, TPB contends that the more favorable the attitude toward behavior and subjective norm, and the greater the perceived behavioral control, the stronger the individual’s intention to perform the behavior should be.

TBD principles are reflected in the study through an exploration of resident attitudes towards the new HCT guidelines (e.g., Is the protocol viewed as positive, negative, or
indifferent?); degree of ease or difficulty in performing program activities; and motivating factors in using intervention tools.

**Interpersonal Level: Social Cognitive Theory**

Bandura’s Social Cognitive Theory (SCT) explains learning in terms of the ecological perspective, that is, the interrelationship between behavior, environmental factors, and personal factors (reciprocal determinism). According to SCT, the learner acquires knowledge as his or her environment converges with personal characteristics and personal experience. Changes in any of these three factors are hypothesized to render changes in the others.

SCT describes several factors that contribute to behavior change: self-efficacy, observational learning, and outcome expectancies. Self-efficacy, which has been found to be one of the most important constructs in behavior change, is having confidence in one’s own ability to carry out an action. Observational learning encompasses the environmental variable: individuals watch the action of others and learn the consequences. Processes governing observational learning include attention, retention, reproduction and motivation.

Outcome expectancies are the values – positive, negative, or neutral - placed on the consequences of a behavior or activity. People must believe that their action will make a difference and that the result will be beneficial. Other constructs are:

- People need to have the ability and skills necessary to act.
- Role models are effective in encouraging behavior change.
- Both social and physical environments may create barriers or facilitate change.
- Observational learning and reinforcement encourage change.

Application of SCT concepts to the study includes exploration of resident skills and confidence level in using the guidelines; degree to which faculty/attending physicians
demonstrate guidelines, encourage utilization, and provide feedback to residents; facilitators and barriers in adherence to the new protocol; and perceived value of the program.

**Organizational Level: Diffusion of Innovations**

Diffusion of Innovations addresses how ideas, products or practices that are perceived as new spread from one group to another. It attempts to explain how an innovation is spread and why it is adopted at both the micro (individual) and macro (societal) levels of analysis. Diffusion differs from theories that focus solely on individuals or small groups by requiring that attention be paid to the innovation (e.g., new idea, product) as well as communication channels and social networks. Rogers suggested that the 4 main elements in the diffusion of innovation process are innovation, communication channels, time, and social system.

Diffusion takes place in stages (awareness, implementation, maintenance) and may occur through formal and informal channels. Disseminating an innovation in a variety of ways increases the likelihood that it will be adopted and institutionalized. A number of factors determine how quickly, and to what extent, diffusion occurs: relative advantage (benefits versus the alternative); compatibility (fit with intended audience); complexity (ease of implementation); trialability (trial on an experimental basis) and observability (produces tangible results). Rogers described the process of adoption as the classic “bell curve,” with five categories of adopters: innovators, early adopters, early majority adopters, late majority adopters and laggards. Some people naturally adopt innovations much earlier than others; identifying adoption stage and adopter category can help guide more effective program planning and research strategies.

By incorporating a Diffusion of Innovations approach, the study seeks to identify the degree to which (1) communication mechanisms and materials are acceptable, adequate, and easy to use, (2) time requirements to learn and implement the protocol are reasonable and
acceptable, (3) program attributes are positive or negative, and (4) the program is consistent with institutional policies and capacity.

**Adult Learning Principles**

Adult learning theories describe ways in which adults assimilate knowledge, skills and attitudes. Just as there is no one theory that explains how humans change their behavior, no single theory of adult learning has emerged to unify the field. The best known theory of adult learning is Knowles’ andragogy.29 Andragogy emphasizes the value of the process of learning. It uses approaches to learning that are problem-based and collaborative rather than didactic, and emphasizes greater equality between the teacher and learner. This is in contrast to pedagogy, which is a more instructional approach that is most often used with children. The pedagogical model is rooted in dependency, e.g., students expect the teachers to make all of the decisions about the material to be learned and way it is taught.

Knowles29 noted that as individuals mature, their need and capacity to be self-directing, to identify their own readiness to learn, and to organize their learning around life problems increases steadily. He identified 6 principles of adult learning:

1. **Self-concept:** As people mature, they move from being dependent to being more self-directed.
2. **Experience:** Adult learners amass a growing set of experiences that provide a fertile resource for learning.
3. **Readiness to learn:** Adult learners are more interested in learning subjects that have immediate relevance to their jobs or personal lives.
4. **Orientation to learning:** As people mature, their time perspective changes from gathering knowledge for future use to immediate application of knowledge.
5. Motivation to learn: Adult learners are more motivated by internal incentives, such as need for self-esteem, curiosity, desire to achieve, and satisfaction of accomplishment.

6. Relevance: As people mature, they need to know why they need to learn something. It is important to consider these principles as mediating factors in assessing the effect of the intervention on resident knowledge, confidence and practice. Therefore, the study explores issues such as whether the program addresses a relevant need, the material is practical and useful, and faculty is responsive to resident experiences.

**RE-AIM Evaluation Framework**

The RE-AIM evaluation model\(^{30,31}\) has been used in recent years to assess theory-based, multilevel public health interventions. The RE-AIM framework purports that the ultimate impact of an intervention is due to its combined effects on 5 dimensions: Reach, Efficacy/Effectiveness, Adoption, Implementation and Maintenance. Whereas traditional clinical trials model emphasize strong internal validity in controlled environments, RE-AIM ascertains that external validity is equally important. By closely examining behavioral and/or disease determinants that are often multilevel and complex, RE-AIM helps identify elements of a program that can most easily be translated into practice across multiple settings.

Though the pilot intervention is implemented within a single organizational setting, positive program results could lead to replication in other residency programs. In using the RE-AIM model, the study focuses on the first 4 dimensions in the framework: program reach, effectiveness, adoption, and implementation – all critical components for successful dissemination across settings. The last dimension, maintenance, requires long-term follow up and is outside the scope of this study. RE-AIM components and theoretical concepts used to guide program evaluation are outlined in Table 6.
Conceptual Model

Using elements of the program logic model and RE-AIM framework, Figure 1 illustrates how theoretical and applied research in HCT, learning, and behavior change informed the intervention planning process, study design, and interpretation of study results. This conceptual model shows an iterative feedback loop that begins with identification of a need to educate residents about HCT clinical guidelines; examines intervention effects, focusing on how individual, interpersonal and organizational characteristics influence change in resident knowledge, attitudes and practice; uses theory and research to guide data interpretation; then identifies additional needs or problems through study data.

Study Overview

The study was conducted in 2 phases, with quantitative methods (survey, chart review) used to address the first 2 research questions and qualitative methods (interviews) used for the last 3 questions. Chapters 2 and 3 of the dissertation are manuscripts that describe methods used in both phases of the study, formatted and edited for academic journals. Whereas the descriptions are appropriate for peer-review publication, Appendix B provides a more detailed description of study methods.

Research Team

Research team members included Diane Straub, MD, MPH, USF College of Medicine, Adolescent Medicine Division Chief and Pediatric Residency Associate Director; Christina Pelaez-Velez, MD, USF College of Medicine, Assistant Professor of Pediatrics; Jazmine Mateus, MPH, CPH, USF Clinical Translational Science Institute, Biostatistician; Jennifer Marshall, PhD, MPH, USF College of Public Health, Community and Family Health, Research Associate; and Susan Horky, LCSW, University of Florida, Co-Director, Pediatric Pulmonary Center
Training Program. Transcription services were provided by 2 COPH graduate students, Donna Sadural and Benetta Ward, and CiviCom, a commercial transcription service.

**Ethical Considerations**

It is important to acknowledge that I (primary researcher) had a dual role in the project as program planner and evaluator. Dr. Straub, Pediatric Residency Program Associate Director, served in a similar capacity. We were sensitive to the risk of researcher bias and attempted to take appropriate methodological steps to minimize bias and maintain objectivity (Appendix B).

To minimize perceived coercion or undue influence when recruiting residents to participate in the study, all study subjects were told that participation was voluntary and there was no penalty for choosing to not participate. Regardless of whether they participated in the study, residents were provided with all components of the intervention. Further, the nature of the residency program is very transparent; that is, residents are encouraged to freely provide feedback about the program. Residents who participated in the pilot interview (Appendix H) said they are often asked to give their opinions about various aspects of the residency program, and felt residents would be truthful in their responses. As such, we believe participants were comfortable in providing constructive criticism and responding to study questions honestly. Residents interviewed were offered a $50 gift card to thank them for their participation.

The study was approved by the USF Institutional Review Board (Appendix K), which required permission from Tampa General Hospital to access patient data/protected health information for the chart review portion of the study (Appendix L).

**Manuscript Development**

Manuscripts are proposed for *Academic Medicine* and *Academic Pediatrics*. Both journals are targeted to academic medical leaders and institutions, though *Academic Medicine* is
broader in reaching both pediatric and adult care physicians. The first manuscript (Chapter 2) provides a description of the intervention and reports short-term impact on resident knowledge, confidence and practice. It will be submitted to *Academic Medicine* as a general scholarly article.

The second manuscript (Chapter 3) will be submitted to *Academic Pediatrics* as a qualitative research report. It provides an in-depth examination of acceptance, usability, and feasibility of the intervention within the context of the RE-AIM evaluation framework. The second paper is distinguished from the first by its focus on the application of learning and behavior change concepts to residency education, as well as the assessment of multiple dimensions of the program, not just effectiveness.
Chapter 2. Residency Education in Transition Preparation
for Adolescents and Young Adults:
A Quasi-Experimental Pilot Study

Abstract

Purpose

To describe a residency education program that uses electronic health records and other methods to teach residents about preparing adolescents and young adults (A/YA) for transition to an adult care model, and to assess its effect on resident knowledge, confidence, and practice.

Methods

Quantitative methods were used to measure change in knowledge, confidence and experience among 67 Pediatrics and Med-Peds residents who participated in the program. The multilevel intervention included age-specific health care transition (HCT) items in the EHR well visit template for all A/YA aged 12-21. We administered a 35-item pre/post-test with residents and a comparison group, and conducted a retrospective chart review of HCT tasks completed by residents during patient well visits. Descriptive and correlational analyses were conducted to compare differences between resident and control test scores for 5 outcome variables, and to measure resident utilization of the EHR tool.

Results

Survey ANCOVA results showed residents (11 matched pairs) scored significantly higher than controls (13 matched pairs) in 2 of 5 outcomes: exposure to HCT learning activities \( (p=.0005) \) and confidence in providing primary care for YSHCN \( (p=.0377) \). Overall utilization of
the EHR tool among 51 residents was 52.8% (57 of 108 patient visits). Patient gender was significantly associated with utilization ($p=.0395$).

**Conclusion**

The program is unique in training residents to systematically prepare all A/YA for transition as well as in using the EHR as a primary teaching tool. Study findings show a positive intervention effect on selected dimensions of resident knowledge, confidence, and experience in HCT.

**Introduction**

The transition to adult life has become an important area of focus as a growing number of youth with special health care needs (YSHCN) move into adulthood. According to the 2009-2010 National Survey of Children with Special Health Care Needs (NS-CSHCN),\(^2\) 18.4% of all youth ages 12-17 have a chronic physical, developmental, behavioral, or emotional condition that requires utilization of health and related services at a higher rate than their typical peers.\(^1\) For this population, uninterrupted transition to adult-based care is critical. Recent data show that only 40% of YSHCN receive appropriate transition services, defined in the NS-CSHCN as discussing the shift to an adult provider and future health care needs, encouraging self-management skills, and providing information about maintaining health insurance coverage in adulthood.\(^2\)

**Need for Physician Education**

Since 2002, the American Academy of Pediatrics (AAP), American Academy of Family Physicians (AAFP), and American College of Physicians (ACP),\(^15\) have recommended that training on how to provide transition services to YSHCN be required for primary care residents and physicians in practice. However, evidence suggests that primary care physicians and
residents continue to lack sufficient training in providing transition services. A 2009 AAP report showed that less than half of pediatricians routinely refer YSHCN to adult physicians, and only 12% create individualized transitional care plans. In 2010, Nazarian et al. found that only 25% of pediatric residents in 5 training programs reported exposure to the topic of transition, although 70% suggested the topic be added to their curricula. Transition was the most highly recommended topic. Adult providers report even greater deficits. A 2010 study of internal medicine and pediatric residents found that, while 73% of pediatric residents had participated in a transition education session, only 14% of internal medicine residents had received training.

**Clinical Report and Algorithm**

In 2011, almost a decade after their 2002 consensus statement, the AAP, AAFP, and ACP readdressed health care transition (HCT) in “Clinical Report-Supporting the Health Care Transition from Adolescence to Adulthood in the Medical Home.” The report reflects a shift in the way HCT is conceptualized by asserting that the goal of HCT is to “maximize lifelong functioning and well being for all youth, including those who have special health care needs and those who do not.” It provides a comprehensive decision-making algorithm to prepare, plan, and implement transfer of care from a pediatric to an adult care model for all adolescents and young adults (A/YA), not just those with chronic conditions or disabilities. The report lays out clear steps for timing and interventions in both pediatric and adult medical homes.

A cornerstone of the algorithm is that all youth, as developmentally able, should be introduced to the adult model of care beginning in early adolescence (e.g., increasing responsibility for self-management, involvement in health care decision-making, speaking to physician alone), regardless of provider type (pediatrician, Med-Peds, family practitioner, subspecialist). The algorithm also specifies an expanded planning process for YSHCN that
includes activities and social support needed for transition to adulthood and independent living. By ages 18 to 21, patients should be fully transitioned to the adult care model.

The report identifies electronic health records (EHR) and information technology as important process components. It affirms that the education of practicing and resident physicians is essential for the integration of HCT principles and processes with medical home concepts. The federally-funded National Health Care Transition Center (National Center) subsequently developed a corresponding set of tools that can be used to document and support transitional care processes. It is currently implementing practice-based HCT learning collaboratives that use the Plan-Do-Study-Act (PDSA) quality improvement (QI) approach to test and implement these tools with physicians.

**Residency Education Programs**

HCT curricula have been introduced in several residency programs in recent years. A study of primary care residents in South Carolina found that residents preferred HCT curricula use a combination of teaching modalities, with clinical experience ranked as the most preferred means for information presentation. They also preferred a continuous HCT training experience throughout residency over a short-term, month-long experience. However, there are few studies that assess the impact of HCT teaching models, and, to our knowledge, none that incorporate recommendations from the clinical report to systematically address transition for all A/YA.

To address this knowledge gap, the Department of Pediatrics in the Morsani College of Medicine at the University of South Florida Health (USF Health) developed and tested a training model for Pediatrics and Med-Peds (combined Internal Medicine and Pediatrics) residents that incorporates the use of EHR as a primary teaching tool. We describe the development and implementation of the intervention, and present evidence of intervention effect on resident
knowledge, confidence, and experience in HCT. We conclude by discussing lessons learned, future implementation plans, and implications for other residency programs.

**Methods**

*Logic Model*

Logic models are often used to define and illuminate key components of an educational or health care program, and can help identify program elements that influence program success.\(^{35}\) We developed a program logic model (Figure 1) that reflects an ecological perspective, illustrating a multilevel framework of mediating factors, resources, activities, outcomes, and overarching goals for effective residency education in HCT. As demonstrated in the National Center’s learning collaboratives, the AAP/AAFP/ACP algorithm\(^ {18}\) is currently being operationalized through a step-wise QI approach of implementing small changes, then re-calibrating as needed in subsequent implementation cycles. Adopting a QI approach, we partnered with our departmental Medical Home Demonstration Project to introduce residents first to the process of *preparing* adolescents for an adult care model, with future PDSA cycles to focus on transition planning and transfer of care processes.

*Intervention Description*

The program was introduced in 2012 to a cohort of 67 Pediatrics and Med-Peds residents who were at various stages in their residency programs. Physician preceptors were informed about the intervention prior to its launch, and were asked to encourage residents to use the new transition protocol. Key components are described below.

**Didactic Presentation.** A 45-minute didactic lecture on HCT guidelines and the intervention was presented twice during the intervention at weekly resident conferences. The
presentation was taped and posted on Moodle, a course material website used by USF Health. Email communication also informed residents of the new protocol and items posted on Moodle.

**EHR Transition Tool.** A core component of our model is utilizing EHR as an experiential learning tool. In a literature review, we identified several transition readiness tools and age-specific checklists\(^{36,37}\) that could be programmed in our EHR platforms (Allscripts and Epic) at 3 continuity clinics. Considerations for the tool were that it be thorough but not overly time-consuming, and be used to help prepare all A/YA for adult care. A panel of USF faculty and HCT experts reviewed our adapted transition checklist (Chart 1) for content validity.

After several months of testing checklist location within the EHR to optimize tool usage, it was ultimately programmed in the well-care adolescent templates for new and established patients aged 12-21. The EHR prompts residents to engage patients and families in age-appropriate HCT discussion and activities at every well-care visit, with additional items specifically for YSHCN. For patients 18 and older, the template includes a “transfer summary” of relevant diagnostic, treatment, and social-behavioral information to forward to new providers.

**Patient Materials and Resources.** EHR tasks include providing patients with print and web-based HCT educational materials developed by our state HCT initiative, Florida Health and Transition Services (FloridaHATS).\(^{38}\) Printed pieces were distributed to each clinic; information and resources for every item in the checklist are also available on the FloridaHATS web site.

**GAPS Questionnaire.** USF Pediatrics patients aged 12 and older are routinely asked to complete the American Medical Association’s *Guidelines for Adolescent Preventive Services* (GAPS) questionnaire in the clinic waiting area prior to their visit. The physician then reviews responses and addresses items of concern with the patient and family. We added 5 health care
self-management questions to the form, providing another prompt for physicians to engage in transition discussions.

Survey Methods

A pre-test/post-test survey design with comparison group was used to assess the degree to which the intervention changed resident knowledge, confidence, and experience in HCT. We invited all 67 residents (50 Pediatric and 17 Med-Peds residents) who received the intervention to complete an online self-report survey, as well as a control group of 52 graduated USF Pediatric and Med-Peds residents from the previous 5 years for whom we had an email address (obtained from our Department of Pediatrics program office).

Survey Instrument. The 35-item survey was comprised of close-ended questions with a Likert-type response scale along with general demographic information (Pediatric versus Med-Peds program, year of residency) and the last 4 digits of the respondent’s social security number to match pre- and post-test data. It was adapted from an instrument originally developed at the University of Kansas School of Medicine, modified to include key HCT activities outlined in the clinical report. Survey questions were reviewed by a panel of USF faculty and field tested prior to administration. It was administered through Qualtrics, a secure online survey software program. All residents and controls were invited via email to participate in the 10-minute pre- and post-intervention survey; reminder emails were sent once weekly over 4 weeks to ensure that everyone saw the communication and had an opportunity to complete the questionnaire.

Analytic Procedures. Ten questions were combined to create 2 composite measures for knowledge: exposure to HCT learning activities (e.g., heard or read about HCT, attended lecture or training on HCT, assisted with HCT in clinic) and familiarity with HCT tools and processes (familiar with standardized HCT tools and resources, patient self-management skills, adult health
care providers, insurance coverage options for patients, health/social/legal services for YSHCN). For confidence, measures were confidence in providing primary care for YSHCN, and in developing a transition plan for YSHCN. Eight items were combined to create one composite measure for experience: implementation of HCT processes and activities (frequency of discussing HCT issues with patients, encouraging self-management skills, discussing insurance options, developing individualized HCT plans, using standardized tools and resources, communicating with adult providers, and spending time alone with adolescent patients).

Analytic tests were conducted to compare pre- and post-test mean scores for the intervention and control groups, using SAS 9.3 and SPSS Statistics 21. ANCOVA was used to determine whether differences between the two groups from pre- to post-test were statistically significant. Effect size was estimated using Cohen’s d. Calculated Cronbach’s alpha coefficients suggested that knowledge (0.51) and experience (0.38) questions had a low consistency of responses within our construct, with confidence (0.73) items found to be consistent. However, we chose to include all of the questions in the analysis because each one represented a unique yet important attribute within our composite measures.

**Chart Review Methods**

We retrospectively reviewed charts of patients seen by residents in the 3 continuity clinics over a period of 60 days. Inclusion criteria for the reviews included all well-care visits for new and established patients ages 12 to 21, conducted by Peds and Med-Peds residents at the 3 clinics. Patient data extracted included age, gender, and presence of a SHCN (at least one chronic condition or disability). Residency data extracted from the EHR and department records included gender, residency program, residency year, clinic location, and EHR system. For each qualified encounter, we noted resident documentation of HCT tasks that were performed (yes/no) during
the visit. The number of items to be addressed ranged from 5 to 16, based on patient age and presence of a SHCN.

Descriptive statistics and correlation procedures using SAS 9.3 were conducted to calculate EHR utilization rates and associations between utilization (dependent variable) and patient or resident factors (independent variables). Fisher’s Exact and Chi-squared tests of significance were conducted for patient and resident variables. Comparison of tool utilization for each independent variable was conducted using General Linear Mixed Effect Modeling.

Results

Survey Results

Among 67 residents who completed the intervention and were invited to participate in the survey, 40 completed the pre-test and 34 completed the post-test, resulting in 11 useable, matched pre- and post-tests. Among 52 graduated residents in the control group, 29 completed the pre-test and 28 completed the post-test, with 13 useable, matched tests. Table 1 shows the composition of intervention and comparison group respondents with matched surveys. Though the intervention sample was comprised of Pediatrics residents only, we have no reason to believe there would be significant differences in responses between Pediatrics and Med-Peds residents.

After controlling for corresponding pre-test values, residents scored significantly higher than controls on the post-test in 2 of 5 outcome variables: exposure to learning activities \((p=.0005)\), and confidence in providing primary care for YSHCN \((p=.0377)\). Table 2 provides summary data along with pre- to post-test change statistics. It is noteworthy that resident mean scores increased from pre- to post-test in all 5 outcome variables, whereas controls showed little gain, and even loss, in some post-test scores. The magnitude of differences between resident and
control mean scores from pre- to post-test were especially large for implementation activities 
\( (d = 2.74) \), familiarity with HCT processes \( (d=1.91) \), and exposure to learning activities \( (d=1.58) \).

**Chart Review Results**

We reviewed patient charts for 108 well-care visits conducted by 51 residents (76.1% of all residents) at 3 continuity clinics over a 60 day period. The remaining 23.9% of residents did not see any patients aged 12-21 during the review time frame. The majority of residents (56.9%) saw more than one patient, with almost one-third seeing 3 to 7 patients.

The EHR checklist was used by 34 residents (66.7%) to address at least one HCT task in 57 of 108 visits, representing a 52.8% overall utilization rate. When the tool was used, the average number of tasks addressed was 9.3 (out of 5 to 16 tasks, based on age and presence of a SHCN). Almost all residents (96.1%) addressed at least 5 HCT tasks, and over 50% addressed 9 to 16 tasks. However, tool usage was somewhat inconsistent. Among 29 residents with 2 or more patient visits, 44.8% \( (n=13) \) used the tool in some visits and not in others. Utilization rates were highest in visits with female patients (66.7%), non-SHCN patients (59.4%), and 12-14 year-olds (55.6%). In comparing HCT tool utilization by both patient and resident variables, only patient gender was significantly associated with utilization \( (p = .0395) \). Table 3 below shows the demographic breakdown of patient visits and effect of patient and resident factors on utilization.

**Discussion**

This pilot study explores the use of the EHR as a conduit to educating Pediatrics and Med-Peds residents about preparing A/YA for transition to an adult care model. In integrating guidelines from the AAP/AAFP/ACP clinical report, we took a step-wise QI approach of focusing initially on preparing patients for transition rather than on transition plan development and transfer of care.
Study findings reflect this approach, showing a positive effect on selected dimensions of resident knowledge, confidence and experience in HCT. Despite the survey’s small sample size, residents scored significantly higher than controls on the post-test in 2 of 5 outcome variables: exposure to learning activities, and confidence in providing primary care to YSHCN. Further, there were very large effect size differences between resident and control mean scores from pre-to post-test in 4 of the 5 outcome variables. Utilization of the EHR checklist provided stronger evidence of change in experience and practice, that is, the degree to which residents engaged patients in HCT discussions. The overall utilization rate of 52.8% fell well below our long-range QI goal of 90.0%, but it was not surprising for the introduction of an entirely new protocol. Certainly, location of the checklist within the EHR is a critical consideration for optimizing usage. We believe that placing it within the well-care adolescent template (versus creating a separate transition section, which was tested early in the intervention) provides greater visibility and accessibility for providers. Given utilization among two-thirds of residents during the chart review time frame, we expect usage to increase over time with continued exposure.

We noted a few interesting findings in EHR utilization patterns and associations. Several residents used the HCT tool inconsistently (used it in one patient visit and not the next), which may be explained, in part, by time constraints or failure to document task completion. When the tool was used, most or all of the HCT tasks were addressed (versus one or two completed tasks). Residents were significantly more likely to use the tool in visits with female patients, though reasons for the association are not clear. And while presence of SHCN was not a significant factor, we were surprised that utilization was higher for patients without SHCN than for those with SHCN. Perhaps this was, again, a reflection of time constraints rather than the resident’s perception of patient need for transition preparation.
There are a number of limitations to our study. The survey’s small sample size limits the degree to which results can be generalized to other residency programs as well as our ability to measure associations between resident factors and outcome variables. In addition, self-reported measures raise questions about response accuracy. Chart reviews were dependent on truthful documentation of activities by residents, though we have no reason to question their accuracy. Our focus on short-term intervention effect in this study limits a broader understanding of multilevel mediating factors (e.g., individual, educational, organizational), barriers, and facilitators that may have influenced program adoption and implementation of the protocol. A more comprehensive assessment of intervention acceptability and feasibility is the subject of a separate report.

Despite these limitations, our study is one of the first to assess impact of residency training in HCT. More broadly, it addresses two important issues for medical faculty: providing essential physician training in the emerging field of transitional care, and using EHR programming as a time-saving teaching tool in medical curricula. Whereas several residency programs have recognized the need for physician education and have introduced HCT training experiences, USF Health is unique in teaching residents to systematically transition all A/YA to an adult care model, not just those with SHCN. Our emphasis on self-management skill acquisition among A/YA aligns with a growing recognition of the importance of patient engagement in all aspects of health care, including health literacy and health care decision-making. Our program is also unique in its use of the EHR as a learning strategy, which ensures that all residents receive consistent clinical guidance and can be adapted by other residency programs. Next steps are to implement additional PDSA cycles to improve HCT tool utilization rates, and to introduce new activities for transition plan development and transfer of care. Further studies are needed to better understand program nuances, generalizability, and effect over time.
Table 1. Logic Model for USF Pediatrics and Med-Peds Residency Education in Health Care Transition

<table>
<thead>
<tr>
<th>Structure</th>
<th>Process</th>
<th>Short Term Impact</th>
<th>Long Term Outcomes</th>
<th>Public Health Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual Factors:</strong> Previous HCT experience and training</td>
<td><strong>Activities:</strong> Introductory didactic lecture at resident and faculty meetings</td>
<td><strong>Learner Objectives:</strong> Increased resident knowledge, confidence, skills</td>
<td>Commitment from department to continue program</td>
<td>Pediatricians will better facilitate smooth transition to adulthood for their patients.</td>
</tr>
<tr>
<td>Residency Program (Peds, Med-Peds)</td>
<td>Lecture video materials and resources posted online</td>
<td><strong>Performance Objectives:</strong> EHR utilization</td>
<td>Improved health services/ patient care</td>
<td>Adolescents and young adults will be better prepared to navigate the adult health care system. This will result in reduced episodes of disease complications; increased knowledge and skills for disease self-management, independent living, inclusive participation in the community, and achieving educational and vocational goals; and increased access to necessary adult-based health care and related services.</td>
</tr>
<tr>
<td>Year of residency</td>
<td>EHR tasks and prompts in continuity clinics</td>
<td>Change in resident behavior/practice</td>
<td>Improved patient satisfaction with resident care</td>
<td></td>
</tr>
<tr>
<td><strong>Educational Factors:</strong> Needs assessment</td>
<td>Modified GAPS screener</td>
<td>Perception of improved patient care</td>
<td>Regional/national adoption of program</td>
<td></td>
</tr>
<tr>
<td>Program design and strategies.</td>
<td>Patient handouts: modified Bright Futures visit summary, FloridaHATS materials</td>
<td>Resident satisfaction with program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional materials and tools based on AAP/AAFP/ACP clinical guidelines.</td>
<td>Series of provider briefs with HCT tips and resources</td>
<td>Faculty satisfaction with program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledgeable faculty and program staff</td>
<td>Evaluation through self-report survey and chart review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organizational Factors:</strong> Department, residency program support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Assumptions**

- An unmet educational need in HCT exists for Pediatric and Med-Peds residents.
- Residents who receive instruction will acquire desired knowledge and skills.
- Delivery of the intervention will lead to good outcomes.
- If resident knowledge, confidence and experience in HCT improve, patient care and satisfaction will improve, the department will continue to support the program, and it could serve as model for other residency programs.
Table 2. EHR Transition Checklist for Well-Care Visits, Ages 12-21

**Health Care Self-Management: 12-14 years**
- Patient can name his/her chronic conditions, if any (yes/needs help/no)
- Patient can name his/her allergies, if any (yes/needs help/no)
- Patient can name his/her medications, if any (yes/needs help/no)
- Patient answers questions asked by provider (yes/needs help/no)
- Patient asks questions of provider (yes/needs help/no)
- Discussed importance of keeping a personal health care record (yes/no)

**For YSHCN:**
- Family is working with patient to help them be independent (yes/no/NA)
- Patient has attended an IEP meeting (yes/no/NA)
- IEP includes health care transition goals/activities, such as health care self-management (yes/no/NA)
- Patient has applied for APD/Medicaid Home and Community-Based Waiver (yes/no/NA)

**Subspeciality Provider Contacts:** [type text here]

**Health Care Self-Management/Transition: 15-17 years**
- Patient can describe how his/her chronic conditions (if any) impact their health. (yes/needs help/no)
- Patient can describe how his/her medications (if any) impact their health (yes/needs help/no)
- Patient can take his/her medications (if any) without supervision. (yes/needs help/no)
- Patient has tried to refill a medication (yes/needs help/no)
- Patient has scheduled a doctor’s appointment on his/her own (yes/needs help/no)
- Patient meets with provider without parents/caregivers present (for part of visit) (yes/no)
- Patient is keeping his/her own health care summary (yes/needs help/no)
- Patient knows source of own medical insurance (yes/needs help/no)
- Patient/family are investigating adult doctors for both primary and specialty care (yes/needs help/no)
- Patient/family are investigating secondary education or vocational opportunities (yes/no)
- Patient has received “10 Steps to Successful Health Care Transition” handout (yes/no)

**For YSHCN:**
- Family has begun Voc Rehab application (yes/no/NA)
- Family has begun guardianship applications (by age 17) (yes/no/NA)
- Transition IEP includes health care transition goals/activities, such as health care self-management (yes/no/NA)
- Patient has applied for APD/Medicaid Home and Community-Based Waiver (yes/no/NA)

**Subspeciality Provider Contacts:** [type text here]

**Transition/Transfer: 18-21 years**
- Patient has selected adult doctors for primary and specialty care (yes/no)
  - Include name/address
- Patient can refill own medication (yes/needs help/no)
- Patient has insurance/SSI benefits (yes/no)
- Patient has received “Just the Facts” insurance guide (yes/no)
- Transfer Summary has been/will be forwarded to new providers (yes/no)

**For YSHCN:**
- There is a formal plan in place for post-secondary education/adult living/vocation (yes/no/NA)
- Have/will verbally communicate with new provider(s) (yes/no/NA)
- Family has completed Voc Rehab application (yes/no/NA)
- Family has addressed guardianship (yes/no/NA)
- Transition IEP includes health care transition goals/activities, such as health care self-management (yes/no/NA)
- Patient has applied for APD/Medicaid Home and Community-Based Waiver (yes/no/NA)

**Subspeciality Provider Contacts:** [type text here]
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Resident (N=11)</th>
<th>Control (N=13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td><strong>Residency Program</strong></td>
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<td></td>
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<tr>
<td>Pediatrics</td>
<td>11</td>
<td>100.0%</td>
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<tr>
<td>Med-Peds</td>
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<td>0.0%</td>
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<tr>
<td><strong>Year of Residency</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>4</td>
<td>36.4%</td>
</tr>
<tr>
<td>Year 2</td>
<td>5</td>
<td>45.5%</td>
</tr>
<tr>
<td>Year 3</td>
<td>2</td>
<td>18.2%</td>
</tr>
<tr>
<td>Year 4</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Graduation Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>1</td>
<td>7.7%</td>
</tr>
<tr>
<td>2007</td>
<td>3</td>
<td>23.1%</td>
</tr>
<tr>
<td>2008</td>
<td>5</td>
<td>38.5%</td>
</tr>
<tr>
<td>2009</td>
<td>1</td>
<td>7.7%</td>
</tr>
<tr>
<td>2010</td>
<td>3</td>
<td>23.1%</td>
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<tr>
<td><strong>Post-Residency Specialty</strong></td>
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<td></td>
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<tr>
<td>Primary Care</td>
<td>3</td>
<td>27.3%</td>
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<tr>
<td>Hospitalist</td>
<td>1</td>
<td>9.1%</td>
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<tr>
<td>Subspecialist</td>
<td>6</td>
<td>54.5%</td>
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<tr>
<td>Undecided</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>9.1%</td>
</tr>
</tbody>
</table>

*Note: For Residents, Anticipated Post-Residency Specialty*
Table 4. Comparison of Resident vs Control Group Survey Composite Scores for HCT Knowledge, Confidence, and Experience

<table>
<thead>
<tr>
<th>Composite Outcome Variables</th>
<th>Max Score</th>
<th>Resident (N=11)</th>
<th>Control (N=13)</th>
<th>Cohen's d</th>
<th>Ancova Coefficient</th>
<th>Change p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pre SD Post SD</td>
<td>Pre SD Post SD</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge (10 items)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure to HCT learning activities (4 items)</td>
<td>4</td>
<td>1.64 1.03 3.18 0.87</td>
<td>3.08 0.86 3.08 0.95</td>
<td>1.58</td>
<td>0.65</td>
<td>0.0005</td>
</tr>
<tr>
<td>Familiarity with HCT processes and tools (6 items)</td>
<td>30</td>
<td>11.45 3.98 16.73 3.38</td>
<td>17.46 4.45 18.15 4.45</td>
<td>1.91</td>
<td>1.77</td>
<td>0.3164</td>
</tr>
<tr>
<td>Confidence (2 items)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence in providing primary care for YSHCN</td>
<td>4</td>
<td>2.82 0.40 3.27 0.47</td>
<td>3.08 0.76 2.83 0.72</td>
<td>0.90</td>
<td>0.52</td>
<td>0.0377</td>
</tr>
<tr>
<td>Confidence in developing a transition plan for YSHCN</td>
<td>4</td>
<td>2.27 0.47 2.55 0.52</td>
<td>2.92 0.64 2.85 0.55</td>
<td>0.60</td>
<td>0.08</td>
<td>0.6855</td>
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<tr>
<td>Experience (8 items)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation of HCT processes and activities</td>
<td>40</td>
<td>15.18 3.43 21.27 3.29</td>
<td>25.31 7.3 24.85 5.46</td>
<td>2.74</td>
<td>2.42</td>
<td>0.1689</td>
</tr>
</tbody>
</table>

Note: Response scales for Knowledge/Exposure items are No=0, Yes=1; Knowledge/Familiarity items are 1=Low to 5=High; Confidence items are 1=Low to 4=High; Experience items are 1=Low to 5=High
Table 5. Demographic Composition of Patient Visits, Effect of Patient and Resident Factors in HCT Tool Utilization

<table>
<thead>
<tr>
<th>Variables</th>
<th>Composition of Patient Visits</th>
<th>Effect of Patient and Resident Variables on Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Patient Visits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100</td>
</tr>
<tr>
<td>Age</td>
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<td></td>
</tr>
<tr>
<td>12-14 years</td>
<td>54</td>
<td>50.0</td>
</tr>
<tr>
<td>15-17 years</td>
<td>44</td>
<td>40.7</td>
</tr>
<tr>
<td>18-21 years</td>
<td>10</td>
<td>9.3</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>54</td>
<td>50.0</td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>50.0</td>
</tr>
<tr>
<td>Presence of SHCN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With SHCN</td>
<td>44</td>
<td>40.7</td>
</tr>
<tr>
<td>Without SHCN</td>
<td>64</td>
<td>59.3</td>
</tr>
<tr>
<td>Residents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>100</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>10</td>
<td>19.6</td>
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<tr>
<td>Female</td>
<td>41</td>
<td>80.4</td>
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<td>Program</td>
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<td>Pediatrics</td>
<td>39</td>
<td>76.5</td>
</tr>
<tr>
<td>Med-Peds</td>
<td>12</td>
<td>23.5</td>
</tr>
<tr>
<td>Year of Residency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>11</td>
<td>21.6</td>
</tr>
<tr>
<td>Year 2</td>
<td>20</td>
<td>39.2</td>
</tr>
<tr>
<td>Years 3-4</td>
<td>20</td>
<td>39.2</td>
</tr>
</tbody>
</table>

Notes:
1. Number of items in the HCT tool to be addressed per visit ranged from 5 to 16, based on patient age and presence of SHCN (see Table 2)
2. General Linear Mixed Effect Modeling used for independent variables
Chapter 3. Educating Pediatric and Med-Peds Residents about Transition from Pediatric to Adult Care: Using the RE-AIM Framework to Evaluate Program Impact

Abstract

Objective

To assess impact of a residency education program that uses electronic health records (EHR) and other methods to teach residents how to prepare adolescents and young adults (A/YA) for transition to an adult care model.

Methods

A qualitative approach was used to examine a multilevel intervention implemented among 67 Pediatrics and Med-Peds residents. The intervention includes age-specific HCT tasks to be completed by residents, programmed in the EHR adolescent well visit template. Using the Reach Effectiveness-Adoption Implementation Maintenance (RE-AIM) evaluation framework as a guide, interviews were conducted with residents and faculty to assess program acceptability and feasibility. Interviews were transcribed and analyzed using an iterative process Data were grouped by common themes and organized within the RE-AIM framework.

Results

Interviews were conducted with 16 residents and 6 faculty. All subjects said HCT education was a highly relevant need. Residents said they had little knowledge or experience in HCT prior to the intervention but felt more confident in their abilities afterwards. The EHR tool was the only intervention element among multiple modalities that reached all study participants,
with over 80% of residents interviewed reporting they used the HCT tool “usually” or “always.” Factors influencing program adoption included accessibility, ease of use, time constraints, patient age and health condition, and attending physicians’ enforcement of the protocol.

**Conclusion**

The intervention is distinctive in training residents to prepare all A/YA for HCT and in using the EHR as a primary learning strategy, a consideration for instructional time limitations. Study findings show both strengths and areas for program improvement.

**Introduction**

In 2011, the American Academy of Pediatrics, (AAP), American Academy of Family Physicians (AAFP) and American College of Physicians (ACP) jointly published a clinical report on how to facilitate transition from pediatric to adult-based care. The report states that the goal of health care transition (HCT) is “to maximize lifelong functioning and well-being for all youth, including those who have special health care needs and those who do not.” It provides an algorithm to guide health care providers in delivering essential transition services to adolescents and young adults (A/YA) in both pediatric and adult medical homes. This is a salient issue for primary care residency education, as research suggests practicing physicians and residents lack sufficient training in HCT.

According to the 2009-2010 National Survey of Children with Special Health Care Needs (NS-CSHCN), 18.4% of all youth ages 12-17 have special health care needs (YSHCN) yet only 40% receive appropriate transition services. The NS-CSHCN defines transition services as discussing the shift to an adult provider and future health care needs, encouraging self-management skills, and providing information about maintaining health insurance coverage in adulthood.
Beyond these data, there is considerable evidence of deficits in physician education about how to provide transition services. A 2009 report from the AAP\textsuperscript{32} indicated less than half of pediatricians routinely refer YSHCN to adult physicians. A study\textsuperscript{4} of 289 adult primary care physicians reported that almost 70\% never or rarely communicate with the pediatric providers who previously treated their patients with SHCN. In 2010, Nazarian et al.\textsuperscript{22} found that only 25\% of pediatric residents in 5 Massachusetts training programs reported exposure to the topic of transition, though 70\% suggested the topic be added to their curricula; transition was the most highly recommended topic. Physicians also identified the need for better training in congenital and childhood onset conditions, as found in Peter et al.’s survey\textsuperscript{40} of 241 internists.

**HCT Guidelines**

The AAP/AAFP/ACP report\textsuperscript{18} recommends that youth, as developmentally able, be introduced to an adult model of care beginning in early adolescence (e.g., encouraging self-management skills, involvement in health care decision-making, speaking to physician alone), regardless of provider type (e.g., pediatrician, family practitioner, subspecialist). By age 18 to 21, patients should be fully transitioned to the adult care model. It further specifies an expanded planning process for YSHCN that includes activities and social supports needed for transition to adulthood and independent living.

The federally-funded National Health Care Transition Center (National Center)\textsuperscript{19} developed a corresponding set of tools to document and support transitional care processes. Important HCT process components include the recommended use of electronic health records (EHR) and information technology. Using a Plan-Do-Study-Act (PDSA) quality improvement (QI) approach, the National Center has introduced practice-based HCT learning collaboratives for physician training.\textsuperscript{33,34}
Residency Education

HCT curricula have also been introduced in several residency programs in recent years, for example at Harvard Medical School\textsuperscript{21} and Indiana University School of Medicine.\textsuperscript{41} In a study of primary care residents in South Carolina, Mennito et al.\textsuperscript{23} found that residents preferred for HCT curricula to include a combination of teaching modalities, with clinical experience ranked as the most preferred means for information presentation. They also preferred a continuous HCT training experience throughout residency rather than a short-term, month-long experience. However, few studies have examined effectiveness of HCT teaching models, and, to our knowledge, no residency programs have incorporated guidelines to systematically address transition with all young patients.

To address this knowledge gap, the Department of Pediatrics in the Morsani College of Medicine at the University of South Florida Health (USF Health) developed an HCT educational intervention for its Pediatrics and Med-Peds (combined Internal Medicine and Pediatrics) residency programs. In interviews with residents and faculty, we explored perceived effect, acceptability and feasibility of the intervention, factors that influenced adoption of intervention elements, and ways to improve the program. We describe the framework used to design and evaluate the intervention, report qualitative findings from the study, and discuss implications for future implementation and replication in other residency programs. These data are part of a larger mixed methods research project; quantitative analyses of intervention effect on resident knowledge, confidence and experience are reported elsewhere.
Methods

Planning and Evaluation Framework

Drawing from adult learning and behavior change theory, we developed a conceptual model for residency education program planning and evaluation that illustrates the integration of individual, interpersonal, and organizational factors in influencing behavior change (Figure 1). The RE-AIM evaluation framework is useful in assessing theory-based multilevel interventions, with the goal of translating health behavior research into practice. A central tenet of RE-AIM is that the ultimate impact of an intervention is due to its combined effects on 5 dimensions: Reach (proportion of target audience participating in the intervention); Efficacy/Effectiveness (impact of intervention on important outcomes); Adoption (proportion of practitioners or settings that adopt the intervention); Implementation (extent to which the intervention is implemented as intended); and Maintenance (extent to which the intervention is sustained over time).

Whereas many evaluation models emphasize strong internal validity in controlled, homogeneous environments, RE-AIM gives equal importance to external validity, that is, its generalizability across settings. Recognizing the complexity and various levels of behavioral determinants, the model pays close attention to the elements of a program that can most easily be translated into other programs or practices. Our evaluation focused on the first 4 dimensions of the RE-AIM framework; the last dimension, maintenance, requires long-term follow-up assessment and was not within the scope of our pilot study.

Intervention Elements

Introduction of the HCT intervention was coordinated with our departmental Medical Home Demonstration Project, which participates in a statewide AAP-sponsored learning
collaborative for practice improvement. Using a QI approach of introducing small changes, then re-calibrating as needed in subsequent PDSA implementation cycles (similar to QI methods used by the National Center), we introduced residents to important processes in preparing adolescents for an adult care model, with future cycles to focus on HCT planning and transfer of care processes.

The intervention was launched in 2012 among 50 Pediatrics and 17 Med-Peds residents who were at various stages in their residency programs. Physician preceptors and chief residents were informed about the intervention prior to its launch, and were asked to remind residents about the new transition protocol. Key components are described below.

**Didactic Presentation.** A 45-minute presentation about the AAP/AAFP/ACP report and our intervention was delivered twice during weekly resident conferences, at launch and 6 months later. A video of the presentation and accompanying materials were posted on Moodle, a course material website used by USF Health. Email communication also informed all residents of the new protocol and availability of the video on Moodle.

**EHR Transition Tool.** The core component of our model is utilizing EHR as an experiential learning tool. In a literature review, we identified several existing transition readiness tools and age-specific checklists\(^\text{36,37}\) that could be implemented within the EHR platforms (Allscripts and Epic) used in our 3 Pediatrics and Med-Peds continuity clinics. Additional considerations for a readiness tool were that it be thorough, concise, and used to help prepare all adolescents for adult-based health care. A panel of USF faculty and HCT experts reviewed our adapted transition checklist (Table 2) for content validity.

After several months of testing optimal locations within the EHR for the checklist, it was ultimately programmed in the adolescent well visit template for new and established patients.
aged 12-21. The EHR prompts residents to engage patients and families in age-appropriate HCT discussion and activities at every well visit, and includes additional items specifically for YSHCN. The template for patients 18 and older includes a “transfer summary” of relevant diagnostic, treatment, and social-behavioral information to forward to new adult providers.

**GAPS Questionnaire.** At USF Health, adolescent patients ages 12 and older are routinely asked to complete the American Medical Association’s *Guidelines for Adolescent Preventive Services* (GAPS) questionnaire in the waiting area prior to their visit. The physician then reviews the questionnaire and addresses any items of concern with the patient and family. We added 5 HCT self-management questions to the questionnaire, providing another prompt for physicians to engage in transition discussions.

**Educational Materials.** EHR tasks include providing patients with print and web-based HCT educational materials developed by our state HCT initiative, Florida Health and Transition Services (FloridaHATS). Informational resources for every item in the checklist are accessible through the FloridaHATS web site. Each patient receives a visit summary at the conclusion of well visits, which includes age-appropriate anticipatory guidance recommended by the AAP Bright Futures program, transition-specific recommendations, and the FloridaHATS web address. In addition, informational briefs targeted to providers were disseminated to residents via email and posted on Moodle.

**Interview Methods**

Qualitative methods, which are often able to capture issues that cannot be captured by statistics alone, were used to explore and better understand resident and faculty perceptions about the intervention. We used semi-structured telephone interviews as our primary data capture method.
collection method. Our research team was comprised of the primary researcher, residency program associate director, and 2 colleagues from public health and social work.

Sampling and Recruitment. Using a stratified probability sample of Pediatrics and Med-Peds residents enrolled at USF Health 9 months after intervention launch, we invited 25 Pediatric and 5 Med-Peds to participate in the study. A purposive sample of 6 preceptors was selected based on experience and availability. Our sampling estimate was guided by theory of saturation, understanding that adjustment might be required during data collection. Potential subjects were contacted via email by the primary researcher, and residents were offered a $50 gift card to thank them for their participation.

Instrument. A semi-structured interview guide was developed based on our study objectives and the RE-AIM framework. Table 6 illustrates how multilevel learning and behavior constructs guided its development. The interview consisted of opened-ended questions about HCT experiences and perceptions, generally, and about intervention elements, specifically. Effectiveness rating scales for various aspects of the program were embedded within the interview protocol.

Procedures. Telephone interviews were conducted by the primary researcher and lasted an average of 25 minutes each. They were digitally recorded, and audiotaped interviews were transcribed verbatim. De-identified transcripts and field notes were analyzed with the assistance of MAXQDA 11, a qualitative data management program. Transcripts were coded by the primary researcher using an a priori and emergent coding system in a constant comparative, iterative process. A portion of the interviews were independently coded by 2 other team members; coded data were discussed and coding strategies were revised until intercoder agreement scores were acceptable and consistent. The data were grouped by common themes,
organized within the RE-AIM framework, and reviewed for commonalities, differences, frequency, extensiveness (degree of detail), and co-occurrence of codes. Two team members then conducted a final review of all coded transcripts, coding strategies, and narrative analysis to improve accuracy of the information. The study was approved by the USF Institutional Review Board.

**Results**

A total of 22 telephone interviews were conducted with 16 residents and 6 faculty preceptors. Among residents, 12 (75%) were female; 12 (75%) were in the Pediatrics program (versus Med-Peds); 1 (6%) was a first year resident, 6 (37.5%) were second year, 6 (37.5%) were third year, and 3 (19%) were fourth year residents. Among faculty, 4 (68%) were female and 4 (68%) were in the Pediatrics department. Major themes are described below, organized within the first 4 dimensions of RE-AIM: reach, effectiveness, adoption, and implementation.

**Reach**

All 67 residents and 12 faculty in the General Pediatrics and Med-Peds continuity clinics were provided with intervention materials, delivered through one or a combination of communication channels (lecture, email, Moodle, printed handouts, and the EHR). However, most residents and some faculty in the study sample reported that they were not familiar with particular program components. Only one-third of residents interviewed attended the didactic presentation during a noon conference, and none reported viewing the recorded session on Moodle. Similarly, another third did not see printed patient materials that were provided to each clinic or knew that the GAPS questionnaire had been modified to include HCT questions. The transition tool in the EHR was the only program element that all interview subjects had used.
Residents

- “Noon conferences are a great way to spread information but there’s a huge percentage of residents that miss it.”
- “There are 6 million pamphlets in that clinic so they just become another pamphlet.”
- “I’ve heard of all of them (patient materials) but I don’t personally know where they’re located in the clinic.”

Faculty

- “I’ve seen the emails but have not had time to read through them.”

Effectiveness

Effectiveness was assessed with respect to resident knowledge, attitudes, confidence, comfort, skills, and experience in preparing A/YA for HCT. Residents and faculty uniformly said that preparing A/YA for adult health care is an important physician responsibility (Table 7) and that HCT training is a valid, relevant need. They stated that it is particularly important to assist patients with complex medical conditions and other vulnerable groups, such as those with mental illness, in low socio-economic environments, or without a strong social support system. Faculty members stipulated that, while it is a physician’s role to provide HCT services, there should be additional clinical support to assist patients with access to adult-oriented social service and public benefits programs.

Almost all residents (94%) said they had minimal or no experience in HCT prior to starting their residency, but all reported moderate or extensive HCT experience at the time of the interview. Several faculty members expressed concern that, though residents could attend to the HCT preparation questions listed in the EHR tool, they were not necessarily more knowledgeable about the complexities of HCT or how to help A/YA access adult services. Some
faculty conveyed their personal frustration in adequately addressing the barriers that many YSHCN encounter in transition and guiding them to appropriate adult care.

When asked about the most useful intervention element, the majority of residents (81%) and providers (67%) cited the EHR tool, followed by the noon conference presentation. More than half of residents (56%) reported that they “always” utilize the EHR tool during A/YA well visits; 25% “usually” and 19% “sometimes” use it. No residents said they “never” use the tool. Faculty perceptions of EHR tool utilization were somewhat lower, with the majority of faculty participants (83%) reporting that the HCT tool is used “usually” or “sometimes.” Though many residents were not familiar with patient educational materials, some (31%) said they had used the materials or web site and found them useful; others said they intended to explore the materials following the interview. In assessing overall intervention effectiveness, faculty was again more conservative than residents, with an average of rating of “somewhat effective” compared to residents’ “mostly effective.”

Residents

• “I’m definitely more comfortable than I was before I started.”

• “I’ve gotten more aggressive with it in the last 6 months...I would say my experience is pretty good.”

• “It’s brought our attention to it (HCT); I don’t think it’s something that a lot of residents really thought about much.”

• “I thought it (noon conference) was really helpful. It brought up some issues I hadn’t really thought about... like teenagers having a voice in what their medical solutions are.”
Faculty

- “I’ve heard from various attendings... and everybody feels like they need to be more knowledgeable and take the time to really better study and understand what the questions are (in the EHR template)”.

Adoption

Study participants described a confluence of factors that influenced the degree to which intervention activities were adopted. Frequently cited barriers and facilitators were accessibility of program materials, ease of use, time constraints, patient age or maturity level, complexity of the patient’s health condition, and involvement of attending physicians in enforcing the protocol. Table 8 provides a more comprehensive description of factors associated with use of the EHR tool.

Limitations with communication channels also impacted adoption. In addition to the relatively small number of residents who were able to attend a noon conference presentation, several residents and faculty said they do not regularly use Moodle. Others acknowledged that they missed or did not remember reading program emails, though most still identified email as a preferred method of receiving program information. Many emphasized the importance of easy access to information; that is, if participants had to search for an item, they were less likely to find and use it. Respondents universally cited the visibility, convenience and ease of the EHR tool as important utilization factors.

Residents

- “I think all of the pieces are there. I just think it’s so hard to get everybody in the same place at one time to do the teaching.”
“Email is probably the best way (to communicate), as long as it’s to the point and not a 30-page email!”

Faculty

“People will miss it if they can’t do it super conveniently.”

Implementation

Study participants reported a number of individual and organizational factors that impacted uniformity of intervention implementation. First, residents assigned to a particular continuity clinic that primarily serves young children (over 50% are less than age 5) had fewer opportunities to interact with A/YA, a fact noted by several residents and faculty. Another clinic did not have computers in every exam room, so residents used laptops, as available, to log into the EHR during patient visits. When a laptop was not available, residents did not have the programmed HCT checklist to prompt discussion. And at least one resident remarked that nurses occasionally forget to give the GAPS questionnaire to patients.

There was also considerable variation in the degree to which attending physicians reinforced the HCT protocol with residents. When asked to what extent faculty encouraged transition discussions, resident responses ranged from “none to minimal” (from a Pediatrics resident) to “a lot” (from a Med-Peds resident). As with residents interviewed, faculty frequently alluded to the challenge of time constraints and prioritizing tasks during adolescent well visits, particularly for patients with complex conditions. Some also expressed discomfort in their knowledge of adult programs and ability to direct patients to appropriate services. All Pediatrics faculty members said they (as attending physicians) needed additional guidance in effective modeling of HCT interactions with A/YA and families.
Finally, several participants offered suggestions on ways to improve adoption and implementation of the training program. In addition to adding faculty development activities, recommendations were to conduct noon conferences that focus on patient educational materials and resources, place HCT reminders and materials in clinic resident rooms, integrate HCT updates in chief resident communications, and enhance the EHR with HCT pop-up banners on A/YA patient charts.

Residents

- “I think some of the attendings might not totally understand (about HCT). So they may have trouble telling us what to do.”

Faculty

- “You just run out of hours in the day to do every single thing that’s good and necessary, and you just have to prioritize what things you actually have time to do.”
- “I’m not sure if I know all the answers to the questions I’m asking.”
- “We, the individual attendings, need to stress to the residents why it’s so important.”

Discussion

Our study aimed to address a knowledge gap about effective models of residency training in preparing A/YA for transition to adult health care. Using a multilevel program planning framework for behavior change, this pilot intervention integrates AAP/AAFP/ACP guidelines to systematically provide HCT services for all A/YA, and emphasizes the use of the EHR as an experiential teaching tool. We assessed intervention impact by examining program reach, effectiveness, adoption and implementation, the first 4 dimensions of the RE-AIM evaluation model.
Study data show both strengths and areas for program improvement. First, residency education in HCT was perceived as a highly relevant need by both residents and faculty. The data indicate that residents had little knowledge or experience in HCT prior to the intervention, but felt more confident in their abilities to assist A/YA after participating in HCT training activities. Due in large part to the “forced” reminder of HCT prompts in the EHR, residents reported fairly high utilization of the tool (81% said they used it “usually” or “always”), despite the time constraints they often encountered.

Some faculty questioned whether the intervention truly effected change in residents’ understanding of HCT and their ability to link A/YA to adult services, at least within the context of a 9-month implementation period. These deficiencies may be attributed, in part, to logistical difficulties in reaching the full cohort of residents with all intervention elements, including the didactic lecture and patient educational materials. Background information covered in the didactic presentation provides context for the new protocol, allowing for a deeper understanding of the issues, and the educational materials provide a plethora of resources to help guide patients to needed services. Increased attention to alternative teaching venues and communication channels, as well as continued implementation of program elements, may improve reach, effectiveness and adoption of the intervention over time. Given residents’ busy schedules, providing uniform training is a struggle generally shared by residency programs.

A critically important aspect of the program – one that we underestimated - is to ensure that faculty are comfortable in their knowledge and ability to implement HCT clinical guidelines within the context of an adolescent well visit. Several faculty members said they are not familiar with local resources available to young adults with disabilities or chronic health conditions, or where to refer patients for assistance in accessing adult programs. Further, most feel challenged
in integrating HCT preparation tasks when office visit time is limited, particularly for patients with complex needs. Targeted training for both physicians and support staff about community resources and how to easily access patient materials should reduce patient visit time.

In addition, both Pediatrics and Med-Peds faculty typically associate HCT with YSHCN who are close to “transfer of care” age (e.g., age 18). They are not accustomed to engaging healthy, young adolescents in discussion about self-care management skills and preparing for an adult model of care. However, the guidelines outline a transition process that occurs over time for all A/YA, not just for YSHCN. Our findings underscore the necessity of integrating faculty education activities into the intervention model and engaging faculty in enforcing the clinical protocol with residents.

Study limitations include small sample size, which may limit transferability of findings results to other programs. Also, as with many qualitative projects, threats to credibility and validity include recall and response bias among interview subjects as well as researcher bias. Though our research team had the dual role of developing and evaluating the intervention and one team member is a residency program administrator, we feel we took appropriate methodological steps to minimize bias and maintain objectivity. Triangulation of these qualitative data with findings from our quantitative study could strengthen estimation of intervention effect.

We believe the USF Health pilot program has important implications for physician education in HCT. First, it is distinctive in its emphasis on training residents to systematically address health care self-management skills with all A/YA, which is consistent with an increasing recognition of the importance of patient engagement in all aspects of health care, including health literacy and shared decision-making. Second, the program is unique in its use of the
EHR as a primary teaching tool. This is noteworthy because all physicians are expected to start using an EHR system over the next few years; it provides a mechanism for both physician education and practice improvement; it can reduce the time needed for didactic instruction; and materials can be replicated across EHR systems, residency programs, and practices. Moreover, an EHR-based intervention may be more easily sustained over time than other types of educational programs, addressing the last dimension of the RE-AIM model: maintenance. Our next steps are to incorporate improvement strategies for HCT preparation, and introduce new activities for transition plan development and transfer of care. Further studies are needed to better understand program impact over time, including effect on post-residency practice.
Figure 1. Conceptual Model for Residency Education Program Planning and Evaluation
Table 6. RE-AIM Evaluation Matrix for USF Pediatrics and Med-Peds Residency Education in Health Care Transition

<table>
<thead>
<tr>
<th>RE-AIM Dimension</th>
<th>Ecological Level</th>
<th>Learning and Behavior Constructs/Variables</th>
<th>Interview Questions and Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reach</strong></td>
<td>Individual</td>
<td>Awareness (of intervention)</td>
<td>Are you familiar with each of the HCT training program components?</td>
</tr>
<tr>
<td><strong>Efficacy/Effectiveness</strong></td>
<td>Individual, Interpersonal</td>
<td>Knowledge, Attitudes, Skills, Satisfaction, Outcome expectations, Motivation, Reciprocal determinism, Behavioral capability, Self-efficacy, Observation/Modeling, Expectations, Reinforcement, Learning should be: Relevant, Based on valid needs, Self-directed, Experiential, Beneficial to the learner, Participatory</td>
<td>What was your pre-residency level of experience in HCT? What is your current level of experience in HCT? Is transition preparation a valid, relevant need? How important is it for physicians to prepare adolescents for transition to adult health care? How important is HCT for all patients versus YSHCN? Are there particular patient groups that are more difficult to transition? To what extent do you think HCT activities will lead to better health outcomes for patients in adulthood? What is the most useful activity in teaching residents about HCT? Do you like or dislike particular intervention components? How frequently do you use the HCT checklist in the EHR? To what extent do you address all of the checklist tasks in the EHR? What are motivating factors for you to use the HCT protocol and materials? Are there consequences for not adhering to the protocol? To what extent do attending physicians encourage you to discuss transition with your patients and to use the new HCT transition tools? Overall, how effective are the training components in preparing Pediatrics and Med-Peds providers to transition their patients?</td>
</tr>
<tr>
<td><strong>Adoption</strong></td>
<td>Individual, Organizational</td>
<td>Communication channels, Time, Compatibility, Complexity, Perceived benefits, Observability</td>
<td>What factors influence how often you utilize each intervention task and activity? What is the degree of ease or difficulty in implementing the new HCT protocol? Are there any HCT tasks that you feel are unclear or unprepared to address? Do you feel any HCT tasks are inappropriate or unnecessary? Are there intervention tasks that you feel are more important than other items? Were training activities explained adequately? Are time requirements adequate to implement the new HCT protocol? Which training materials and educational resources are the most useful and practical? What are the most effective ways for you to receive information on transition materials?</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td>Individual, Organizational</td>
<td>Integrity of delivery, Consistency in utilization</td>
<td>To what extent are intervention activities consistent or in conflict with USF Health policies? Are there any organizational barriers to implementation? Do you have suggestions to improve the training?</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td>Individual, Organizational</td>
<td></td>
<td>Note: Maintenance not addressed in interviews</td>
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**Note:** Maintenance not addressed in interviews
Table 7. Resident and Faculty Perceptions of Program Effectiveness

<table>
<thead>
<tr>
<th>Effectiveness Scales</th>
<th>Residents (N=16)</th>
<th>Faculty (N=6)</th>
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<tbody>
<tr>
<td>Importance of physician-driven HCT services for all A/YA</td>
<td>4.44</td>
<td>4.50</td>
</tr>
<tr>
<td>I (unimportant) to 5 (very important)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provider utilization of HCT tool in the EHR</td>
<td>3.47</td>
<td>2.75</td>
</tr>
<tr>
<td>I (never) to 4 (always)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Resident’s current level of experience in HCT</td>
<td>3.78</td>
<td>--</td>
</tr>
<tr>
<td>1 (very minimal) to 5 (very extensive)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall effectiveness of the HCT training program</td>
<td>3.81</td>
<td>3.08</td>
</tr>
<tr>
<td>I (not effective) to 5 (very effective)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Mean score for resident’s current level of HCT experience compares to a mean of 1.31 for pre-residency experience in HCT
Table 8. Factors Associated with HCT Tool Utilization

<table>
<thead>
<tr>
<th>Factors</th>
<th>Description</th>
<th>Resident Quotes</th>
<th>Faculty Quotes</th>
</tr>
</thead>
</table>
| **Convenience/Accessibility**   | Participants consistently identified convenience as an important factor in utilization. Most said the EHR tool was the most useful element in the intervention because it served as a “forced” reminder to address HCT during the visit. | • “That’s been the most helpful because it reminds us every single time.”  
• “It’s so easy to use. Why not use it?”  
• “You don’t always remember to do it if you don’t see it on the template.” | • “Anything new...almost has to be ‘in your face’ for a little while to make it part of your routine.”   |
| **Time**                        | Both residents and faculty said that time constraints can be a barrier to addressing questions in the HCT tool. Several residents estimated the checklist took 5 minutes to administer, but it was dependent on factors such as the patient’s medical condition and developmental stage. | • “If I have X number of things to cover, is this going to be one of them with the time I have allotted?”  
• “If there are a lot of issues going on, I can’t always use it because of time constraints.” | • “There is barely enough time to just do the actual medical stuff.”  
• “I don’t think it’s a physician’s role to act as a social worker all the time. There’s no time for stuff like that.” |
| **Patient Medical Condition**   | Most participants said they feel HCT preparation is particularly important for YSHCN, and some said they were more likely to use the tool with those patients. Several faculty members said they are more likely to remind residents about HCT if the patient has complex needs. | • If I’m sure the patient doesn’t have anything chronic...that’s when I may skip them (HCT questions).”  
• “If they have a lot of medical conditions, it’s something I spend a little more time with.” | • “I’m much better at it when kids have a chronic condition or special health care need.” |
| **Patient Age**                 | A number of residents said they were more likely to skip questions in the HCT tool with younger patients than with older ones who were close to transferring to adult care. | • “For some of the youngest kids, I felt that maybe it was not yet appropriate to be spending the limited time I had discussing that kind of stuff.”  
• “I assess whether they have the intellectual capability as well as their age.” | • “I think the older they get, the more likely the resident will ask those questions.” |
| **Reinforcement from Attending Physicians/Chief Residents** | Both residents and faculty emphasized the importance of attending physician enforcement of the HCT protocol. Reminders from chief residents were also perceived by residents as an effective way to increase tool utilization. | • “If the attending wants you to do it, everyone does it without question.”  
• “Whatever my attending says, I definitely take notice of that.” | • “If I were to push it... it would then become habit.”  
• “We just have to keep reminding them... to have it become the template in their head as well.” |
Chapter 4. Conclusions and Implications

Triangulation of Data

The purpose of this dissertation was to assess impact of an HCT residency education program at USF Health, using the RE-AIM framework to guide evaluation. This was accomplished using a mixed methods, quasi-experimental research design comprised of surveys, chart reviews, and interviews. Returning to the 5 research questions, the first 2 questions were addressed using a quantitative approach (Chapter 2), and the last 3 were addressed using a qualitative approach (Chapter 3). A strength of the study in its entirety is that the 2 approaches are complementary processes, allowing for triangulation of data and a better understanding of modifying factors, barriers and facilitators that influenced intervention impact. In this chapter, findings from each data source are compared and triangulated to provide a more comprehensive and credible view of study results.

Qualitative interview data, which included embedded rating scales, appear to reinforce survey and chart review data that show a positive intervention effect on selected dimensions of knowledge, confidence, and experience. In interviews, residents uniformly said their knowledge, comfort level and patient interactions in HCT had increased since introduction of the training program. However, some faculty questioned whether residents were truly more knowledgeable and could appropriately refer patients to adult services, or whether they were simply attentive to the HCT preparation questions in the EHR. These data support survey findings that showed significant change in some aspects of knowledge (exposure to learning activities) and confidence (in providing primary care for YSHCN), but not in others (familiarity with HCT processes and
tools, confidence in developing a transition plan for YSHCN). Because the pilot intervention focused on HCT preparation rather than plan development or transfer of care, it is not surprising that the latter outcome variables did not increase significantly. Experience, as measured in the survey (implementation of HCT processes), showed no significant change compared to controls, though residents interviewed reported considerable gains in experience. Certainly, differences between survey constructs and interview subjects’ notions of knowledge, confidence, and experience are important considerations in data interpretation and triangulation.

In comparing interview and chart review data on HCT tool utilization in the EHR (another measure of experience and practice), over half of residents interviewed (56.3%) said they “always” use the tool, versus chart review data that indicated 41.2% of residents used the tool in every patient visit (Figure 2). Data from both sources showed some inconsistency in usage: 43.8% of residents interviewed said they use the tool “usually” or “sometimes,” and 25.4% of residents in the chart review used the tool in at least one visit but not in all visits. The largest discrepancy between interview and chart review data concerned non-utilization of the tool: all 16 residents interviewed said they used the tool at least “sometimes,” while 17 of 51 residents (33.3%) in the chart review did not use it at all (or did not document usage). Faculty interviewed were more conservative in estimating tool usage among residents: on a scale of 1 (never) to 4 (always), their average score of 2.75 was more closely aligned with chart review data showing 66.6% of residents used the tool in 52.8% of patient visits. This difference raises some concerns about accuracy of resident self-report data in interviews, particularly with respect to the research team’s dual roles in program planning and evaluation, and its influence on resident responses. However, while noteworthy, these data do not substantively impact overall study results.
Resident (rather than patient visit) is the unit of analysis in this figure.

![Bar chart showing frequency of HCT Tool utilization among residents](chart.png)

*Resident (rather than patient visit) is the unit of analysis in this figure.*

Figure 2. HCT Tool Utilization: A Comparison of Chart Review and Interview Data

Both residents and faculty described several barriers to consistent use of the new protocol, such as time constraints, reminders from attending physicians, availability of laptops in exam rooms, and patient age and medical condition. Interestingly, the one factor found in the chart review to be a significant predictor of tool utilization – patient gender – was not mentioned by any interview subjects. Lastly, chart review data showed no significant differences in intervention effect among subgroups of residents based on residency program (Pediatrics versus Med-Peds), year of residency, and gender. Interview data appear to support this finding, but survey sample sizes were too small to examine associations between resident characteristics and program effectiveness.

Beyond measures of effect, interviews provided rich data that could not be captured in surveys or chart reviews, such as resident and faculty perceptions of the intervention, factors that influenced program adoption and implementation, and recommendations for improvement. Of note, one faculty member raised a concern that some YSHCN and young adults with chronic health conditions do not regularly schedule well visits, particularly if they have complex...
conditions that require frequent subspecialist visits or their insurance plan does not require authorization from a primary care provider. For that population, transition discussions may be missed because the HCT tool is programmed in the adolescent well visit template. This issue was not included in Chapter 3 results because it was raised by a single respondent, but further investigation into scope of the issue and potential solutions is an important next step.

Also not reported in qualitative study findings (Chapter 3), several residents interviewed said healthy teenagers are the most difficult population of A/YA to transition. Though the majority of residents and faculty identified A/YA with complex conditions as the most challenging, some residents said that, because healthy teenagers may be less likely to schedule regular office visits, they miss valuable opportunities for education about health care. This perception appears to support findings from a recent study conducted at Georgetown School of Medicine\textsuperscript{62} that showed adolescents without SHCN were slightly less prepared in the transition process than those with SHCN. While these data were not salient for the manuscript, they reinforce a need for transition preparation strategies for A/YA with and without SHCN.

As discussed earlier, there were a number of limitations to the study. The small sample size in both phases limits the degree to which results can be generalized or transferred to other residency programs, as well as our ability to measure associations between resident factors and outcome variables. The survey instrument was adapted from one used previously at another institution. Whereas use of this tool allows for comparison across residency programs, survey questions addressed all aspects of the transition process rather than preparation only (the focus of our intervention). Reliability and validity of findings could be improved with a larger study sample and a redesigned survey instrument that focused primarily on knowledge, confidence and experience in HCT preparation.
Structural factors that were identified as barriers to consistent use of the HCT protocol also influenced the validity of overall findings, e.g., awareness among residents about educational materials, number of A/YA patients seen in continuity clinics, availability of laptops in exam rooms, and faculty knowledge of transition. Further, chart reviews were dependent on truthful documentation of activities by residents, and self-report measures raise questions of accuracy. Threats to credibility and validity of qualitative findings include recall and response bias among interview subjects as well as researcher bias. Though our research team had the dual role of developing and evaluating the intervention and one team member is a residency program administrator, we attempted to take appropriate methodological steps to minimize bias and maintain objectivity.

Usefulness of the Conceptual Model

Study findings illustrate the usefulness of the conceptual model (Figure 1) used to guide program design and evaluation. The model incorporates learning and behavior change constructs from the ecological perspective, Theory of Planned Behavior, Social Cognitive Theory, Diffusion of Innovations, and adult learning principles. RE-AIM provided a framework in which to identify strengths and weaknesses of the program at each level of influence (individual, interpersonal and organizational), positioning the pilot intervention for improvement and potential replication in other residency programs.

The study showed that change in resident knowledge, confidence and experience in HCT was influenced by individual factors such as perceived importance of HCT and motivation (“it’s the right thing to do”); interpersonal factors such as attending physicians’ modeling and enforcement of the protocol with residents, or perception of patient need (age, medical condition, level of family support); and organizational influences such as time constraints, availability of
computers in exam rooms, and patient populations served in continuity clinics (i.e., young children versus A/YA). Diffusion of Innovations principles were especially helpful in understanding differences in intervention adoption rates among program participants. Critical appraisal of these factors within the context of reach, effectiveness, adoption, and fidelity of implementation resulted in identification of important program strengths (HCT tool in EHR provides a convenient and consistent way to reach all residents) and gaps (limited venues for didactic instruction and material dissemination, faculty education). Weaknesses and gaps uncovered in the pilot should guide program improvement efforts.

Further, new research questions emerged from the study. These include examining intervention effect over time (Do tool utilization rates change with continued exposure?), assessing the impact of program enhancements (Can faculty training improve intervention adoption rates?), and exploring the sustainability of resident skills in post-residency practice (Do residents who engage in HCT preparation discussions with their patients continue to provide HCT services in community practice?) In an iterative feedback loop, the model shows how learning and behavior change theory and applied research continuously inform our knowledge about residency education in HCT.

Implications

This dissertation study contributes to the overall body knowledge regarding HCT by increasing our understanding of ways to effectively educate physicians in training about preparing A/YA for the adult care system. The USF Health model is unique not only in training residents to systematically prepare all A/YA for HCT, as recommended in the AAP/AAFP/ACP clinical report, but also in using the EHR as a primary learning strategy. Findings indicate that a concise, age-specific checklist in the EHR adolescent well visit template is a useful method to
educate residents about HCT preparation activities that need to be addressed with every A/YA aged 12-21. Despite time constraints often experienced during adolescent visits, the EHR tool provides a convenient, “forced” reminder of essential HCT discussion items, and uniformly reaches all residents. It can be used across EHR systems, and integrated into clinical practice using evidence-based QI approaches.

However, an EHR teaching tool should be accompanied by other teaching strategies; that is, there should be instructional methods that can provide background and context about the importance of physician-driven HCT services, as well as education about local adult services and resources. Faculty engagement and commitment to reinforcing the HCT guidelines with residents is critical, as is their comfort in providing HCT services to A/YA with and without chronic health conditions or disabilities. Viewed through the lens of a QI approach, the pilot intervention reflects a dynamic rather than static process that allows us to assess whether proposed changes actually work in practice. Next steps for USF Health are to implement recommended improvement strategies for HCT preparation, and to introduce training activities in transition plan development and transfer of care.

Implications for public health extend beyond residency education and physician training. While the MCHB has primary responsibility for ensuring that YSHCN move smoothly from pediatric to adult care, successful transition to adult life is a concern shared broadly across multiple disciplines. This study provides an example of individual sectors (primary care and public health) working together to improve population health. Cross-disciplinary collaboration – a key tenet of public health – offers a range of opportunities to improve outcomes in adulthood. Listed below are considerations for future action:
1) Mechanisms are needed to ensure post-residency sustainability of transition activities. Practicing physicians in the community need accurate and regularly updated resources, which may be provided through local agencies such as independent living centers, advocacy organizations, and social service information and referral programs (e.g., 2-1-1). Florida’s Title V transition initiative, FloridaHATS, serves as a centralized clearinghouse of HCT information for both consumers and providers, including materials for A/YA and families, provider tip sheets and training modules, and a web-based Health Services Directory for Young Adults that is searchable by type of service, location or key word. FloridaHATS is linked to other state programs associated with post-secondary education, employment, and independent living. An important message for any practicing physician is to seek out and become familiar with local transition-related resources. Fortunately, several states have introduced easily accessible, centralized transition programs similar to FloridaHATS.

2) Intervention elements should be adapted for professionals in training within other health care or related disciplines, such as physician extenders (physician’s assistant, nurse practitioner), nurse care coordinators, and social workers. Several faculty interviewed reported a need for clinical support staff that are knowledgeable about HCT to assist both patients and physicians throughout the transition process. Expanded workforce training in HCT would support the medical home “team” approach, allow for more efficient use of limited physician time, and potentially improve transition outcomes for A/YA.

3) Growing recognition of the importance of patient engagement in health care, along with clinical guidance to prepare all A/YA for adult care, suggest that the acquisition
of health care self-management skills should be introduced earlier and addressed more frequently across the lifespan. Staged self-management skills such as those in USF Health’s EHR tool and other HCT readiness instruments\textsuperscript{36,37} could be integrated more broadly in child and adolescent health policies and tools. Simple tasks and responsibilities should start by early adolescence (e.g., name health conditions, allergies, medicines; talk to doctor during visits) and increase incrementally over time. Self-management concepts, anticipatory guidance, and standardized measures are not adequately addressed in childhood preventive care tools such the AAP’s Bright Futures or the GAPS (though materials from each were modified for the USF Health intervention), and should be strengthened through MCHB and professional association policies.

4) Explore opportunities to infuse health care self-management and related self-advocacy activities in other systems that serve A/YA. This may include development of an HCT tool that can be integrated across multiple service systems. For example, public schools have a federally mandated responsibility to develop a Transition Individualized Education Plan (TIEP) for each student who receives special education services, for the purpose of preparing the student for adulthood. Though most items addressed in HCT readiness tools are life skills that are necessary for post-secondary adult life, health care self-management goals are rarely included in TIEPs. Similar transition planning processes occur for adolescents exiting foster care and the juvenile justice system. A single, validated HCT preparation and planning tool (without transfer of care processes, which are exclusive to medical providers) that can be promoted widely and integrated in other systems could facilitate better
communication and help streamline planning efforts among organizations simultaneously involved with A/YA.

5) Future research should encompass *post-transfer* health outcomes. We must begin to systematically examine health care access and quality of care *after* transition to the adult system. One approach to capturing post-transition outcomes is to measure the percentage of young adults ages 18-25, with and without disabilities or chronic health conditions, who have an adult-oriented medical home and adequate health insurance. Though several existing population-based data sources report on selected dimensions of medical homes, none fully capture the degree to which young adults are receiving age-appropriate care in a patient-centered medical home. Solutions might include creating a survey item set to measure “has a medical home” (similar to the one used in the NS-CSHCN, in which several components must be met for a core outcome) and adding it to an existing survey such as the Behavioral Risk Factor Surveillance System Survey or National Health Interview Survey; developing a Healthy People supplement for young adults; or expanding the NS-CSHCN or National Survey of Children’s Health to include young adults aged 18-25. Certainly, any solution will require a considerable investment of resources. However, until we address this largely understudied phenomenon in the health care system, we will be missing an important piece of the HCT construct.

Our understanding of HCT has evolved since Blum et al.\(^6\) defined the concept in 1993, along with our approaches to service provision and provider training. As with the MCHB’s leadership role over the past decade in supporting HCT services for YSHCN, it is essential for public health to continue, and, perhaps, expand its role in transitioning A/YA to adult care systems.
References


Appendices
Appendix A. Literature Review

This literature review provides historical context for the concept of health care transition (HCT), examining its application in past and current policy, practice, performance improvement, and education. It identifies key challenges to successful HCT, describes knowledge gaps in physician education and training, and summarizes how the study will contribute to the body of knowledge about residency education in HCT.

Federal Policy

During the 1980’s, there was growing awareness within the health care community about the need to better accommodate the rapidly increasing population of C/YSHCN who were living into adulthood. In response to this emerging health care system problem, U.S. Surgeon General C. Everett Koop convened conferences in 1984 and 1989, entitled, respectively, “Youth with Disability: The Transition Years” and “Growing Up and Getting Medical Care: Youth with Special Health Care Needs.” The second meeting brought together health care providers, families, youth, and policy makers to present data and information, share experiences and recommend actions. Key recommendations were to recognize the importance of starting the transition process early; promote the autonomy and self-management skills of adolescents; educate pediatricians about promising transition practices; build bridges between pediatric and adult medicine; and provide adult-oriented physicians training in the management of childhood-onset conditions.

Also in 1989, MCHB created a mandate that served as the foundation of State Title V programs for C/YSHCN. This mandate outlined the need to develop systems of care for C/YSHCN that are family-centered, community-based, coordinated, and culturally competent. The MCHB subsequently adopted a broad definition of C/YSHCN to include those “who have or
are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who require health and related services of a type and amount beyond that required of children generally.\textsuperscript{1} (p 137)

In 2001, transition was incorporated into the President’s “New Freedom Initiative” as part of a national plan to promote community integration for people with disabilities.\textsuperscript{45} Charged with facilitating community-based service systems for C/YSHCN, the MCHB developed a 10-year agenda titled “Achieving Success for All Children and Youth with Special Health Care Needs.”\textsuperscript{46} The agenda included six core outcomes for improving care for C/YSHCN: family professional partnerships, access to a medical home, adequate insurance, early and continuous screening, organization of systems for ease of use, and ensuring that “all youth with special health care needs will receive the services necessary to make transitions to all aspects of adult life, including adult health care, work, and independence.” \textsuperscript{46 (p7)} These six indicators were ultimately incorporated as part of a Healthy People 2010 objective for C/YSHCN.\textsuperscript{47}

Concurrently, the NS-CSHCN,\textsuperscript{2} sponsored by the MCHB and conducted by the Center for Disease Control and Prevention’s National Center for Health Statistics, was introduced to track national and state progress towards meeting MCHB’s core outcomes. Administered every four years, the NS-CSHCN continues to be the primary population-based data collection tool that measures HCT as conceptualized by the MCHB, that is, “preparation” or “planning” for transfer from pediatric to adult health care among YSHCN aged 12-17. A core transition outcome is calculated from the results of four component measures. Three measures focus on whether parents received anticipatory guidance from their child’s health care providers in discussions about shifting to adult providers, future health care needs, and future insurance needs. The fourth measure is the degree to which providers encourage youth to assume responsibility for health.
Results from the 2009-2010 NS-CSHCN\textsuperscript{2} indicate that, nationally, only 40\% of youth met the core transition outcome. This composite score did not change significantly from 2005-2006 (41.2\%).\textsuperscript{2} Researchers have further analyzed survey data to examine the factors associated with component and composite outcomes at both national and state levels. McManus et al.\textsuperscript{48} found that 78\% of respondents said providers usually or always encourage children to take responsibility for their health; 42\% reported having a discussion with providers about shifting to an adult provider (in cases where the provider treats only children); 62\% discussed their child’s future health care needs; and 34\% discussed future insurance needs. They also found that Non-Hispanic black or Hispanic race/ethnicity, lower income level, not speaking English, and not having a medical home reduced the odds of meeting the MCHB core outcome. Nishikawa et al.\textsuperscript{49} found that youth with lifespan-oriented providers (e.g., family medicine, internal medicine) were more likely to report having discussed issues related to transition than child-only providers, and that discussion involving adult health insurance, in particular, was lacking for all YSHCN.

It should be noted that, as our understanding of HCT has evolved, MCHB’s measurement strategy for the transition outcome has been refined to more accurately capture the concept of transition. While there were few substantive changes from 2005-2006 to 2009-2010, some survey results cannot be easily compared. An MCHB workgroup of HCT experts are currently developing recommended changes for the next survey in 2013-2014. The changes are expected to reflect elements in the AAP’s 2011 clinical report on transition,\textsuperscript{18} discussed later in this section.

In 2011, an HCT objective was introduced in the HP 2020 Disability and Health topic area. MCHB’s operational measure – transition preparation - was used to develop the new objective: “Increase the proportion of youth with special health care needs whose health care provider has discussed transition planning from pediatric to adult health care.”\textsuperscript{8} As with the core
transition outcome, the data source used to monitor progress towards achieving the objective is the NS-CSHCN. Using a baseline figure of 41.2% from the 2005-2006 survey, the HP 2020 goal is to increase transition preparation among YSHCN by 10%. The introduction of this new objective is viewed by many as an important step towards establishing HCT as a national priority and influencing future public policy.

**State Policy**

Because transition is identified as a Title V Block Grant performance measure, State Title V CSHCN Programs are required to report on transition-related activities in their annual reports. Other than this federal reporting requirement, states are responsible for the development and implementation of their own programs to improve HCT outcomes.

There is considerable variability in state-level transition performance. Data from the 2009-2010 NS-CSHCN show a 22 percentage point difference in the outcome measure between the highest state, Kansas (52.7%), and the lowest performing state, Nevada (31.7%). In a 2009 study, Kane et al. found that state differences were due, in part, to two system-level factors: having a medical home and adequate insurance coverage. Race-ethnicity was also found to be associated with performance. There appears to be no other published research that examines state-driven variables that might contribute to better or worse transition outcomes, such as state legislation, funding, or Title V program structure.

The MCHB monitors and shares some state transition program information through its HCT National Center web portal. There are links to several state HCT programs in its “State Innovations” section, including Maryland, Montana, New York, Washington, North Carolina Massachusetts, and Florida. The Center will continue to add content to their website about states that have taken the lead to develop transition plans, policy and interagency transition coalitions.
Challenges to HCT

Problems that interfere with A/YA with chronic health conditions or disabilities receiving the services and supports they need are numerous and well documented.\textsuperscript{9-14} Frequently cited barriers to HCT include: lack of primary and specialty adult providers willing to take A/YA due to low Medicaid reimbursement rates; lack of training concerning childhood onset conditions among adult providers; lack of reimbursement for time required by pediatric or adult primary care practices to provide transition services; lack of knowledge among providers about how to support transitioning A/YA; lack of adequate insurance coverage among A/YA due to loss of public and private insurance during young adulthood; cessation of public programs for A/YA between ages 18 and 21; eligibility and access barriers to Supplemental Security Income (SSI) and Medicaid as an adult; delays in the reauthorization process for adult SSI; requisite two-year waiting period before qualifying for Medicare benefits; limited employment opportunities for emerging adults that offer employer-based insurance; absence of referral networks; lack of knowledge about community resources for A/YA; and difficulty that youth and families have in leaving trusted pediatricians.

Readiness of A/YA and their families for the move to adult medicine is identified in the literature as a significant barrier to successful transition.\textsuperscript{9} Adult-oriented health care providers expect their patients to be autonomous and able to negotiate the health care system with little or no help from their physicians. In order to be ready to receive care from the adult health care system, young adults must be capable of carrying a broad range of tasks and activities that include: making appointments and showing up on time for medical visits; providing a medical history, giving detailed information about their current symptoms; actively participating in medical decision-making; following through on referrals; filling prescriptions and taking
medications as directed and otherwise adhering to the physicians course of treatment; and having health insurance or otherwise being able to pay for needed care.13,52

A 2009 AAP report32 showed that less than half of pediatricians routinely refer YSHCN to adult physicians, and only 12% create individualized transitional care plans. A study53 of 289 adult primary care physicians in Rhode Island reported that 77% never or rarely receive a written transfer summary for YSCHN from pediatric providers, and 69% never or rarely communicate with the pediatric providers who previously treated their patients with special health care needs. In 2010, Nazarian et al.22 found that only 25% of pediatric residents in 5 Massachusetts training programs reported exposure to the topic of transition, though 70% suggested the topic be added to their curricula, making transition the most highly recommended topic.

Adult-oriented providers report even greater deficits. In Peter et al.’s survey40 of 241 internists across the country, internists clearly stated the need for better training in congenital and childhood onset conditions. Similarly, a 2010 study21 of internal medicine residents and pediatric residents found that, although 73% of pediatric residents had participated in a transition education session, only 14% of internal medicine residents had received training.

Lack of systematic transfer to adult care at the practice level can also impact hospital quality of care. In an examination of patient records at 30 academic children’s hospitals, Goodman et al.54 found in a 2011 study that there has been a significant increase in the rate of adult survivors of pediatric diseases seeking care as inpatients in children’s hospitals. While children’s hospitals may have the expertise to treat these conditions, their physical facilities and supplies are not designed for adults, and personnel are likely to be less trained – or unlicensed - to provide adult care.
Since Blum et al. first introduced the term “health care transition” in 1993, numerous policy and position statements have been issued by professional organizations addressing the need for transition services for YSHCN. In 2002, the AAP, AAFP, and ACP issued a consensus statement identifying six critical first steps for ensuring a successful transition, which included having a primary care provider with responsibility for transition planning. In 2003, SAM updated its 1993 position paper on transition by endorsing the Consensus Statement and further recommending engaging the adult health care sector to make services available, develop best practices, and eliminate processes and policies that restrict transition.

As health care professionals have formulated guidelines for successful transition, a proliferation of HCT programs have appeared in a variety of health care settings, including primary care practices, specialty clinics, and hospital-based programs. The result has been increased focus on policies to improve quality of care and performance in clinical settings, and advancing broad adoption of effective transition practice among physicians. In 2009, the National Guideline Clearinghouse established a best evidence statement (BESI) for the assessment of transition readiness among adolescents who have had a kidney transplant. In 2011, MCHB’s core transition outcome was endorsed as a new measure by the National Quality Forum.

The most important development in recent years is the release of a clinical report from the AAP, AAFP, and ACP in the June 2011 issue of Pediatrics. Whereas previous policy statements provided general guidance for transitioning YSHCN, the 2011 report provides a comprehensive decision-making algorithm to prepare, plan, and implement the transfer of care from a pediatric to an adult care model for all adolescents and young adults, not just for those...
with chronic health conditions. It lays out clear steps for timing and interventions for both pediatric and adult medical homes, and includes the development of an individualized transition plan as a standard component of care.

**Practice Improvement**

The report affirms that the education of practicing and resident physicians is essential for the integration of HCT principles and processes with medical home concepts. Though the new guidelines have not yet been widely adopted, they are being used in practice-based learning collaboratives administered by the MCHB-funded HCT National Center. The learning collaboratives are an adaptation of models used by the National Initiative for Children’s Healthcare Quality and pioneered by the Institute for Healthcare Improvement. Using a Plan-Do-Study-Act (PDSA) QI approach, practices in the collaboratives assemble a QI team consisting of a lead physician, a care coordinator or other staff member, and at least one youth or family member. The teams participate in a 10-month process to test and implement tools corresponding to components of the algorithm, focusing primarily on targeted patient populations of YSHCN.

The National Center also developed “Six Core Elements of Health Care Transition,” a corresponding set of tools to document and support transitional care processes that can be downloaded from their web site. It includes a 6-item Health Care Transition Index - modeled after the Center for Medical Home Improvement’s Medical Home Index – to measure progress toward better transition support in practice settings. Each practice assesses the quality of their HCT support at baseline and at the end of the learning collaborative experience. Reiss has suggested that limited adoption of the new guidelines may be due, in part, to physicians seeing HCT as a new, distinct task that requires more time than is available during
medical visits with adolescents. He proposed a long-term stepwise approach of using typical clinical encounters to facilitate appropriate involvement of A/YA in their own care.

Notably, the AAP Illinois Chapter \textsuperscript{61} recently developed HCT training modules for both pediatric and adult care physicians that are approved by the American Board of Pediatrics, American Board of Internal Medicine, and the American Board of Family Medicine, for fulfilling physician Maintenance of Certification requirements. As with the learning collaboratives, the Illinois modules incorporate new guidelines and tools using a QI approach. The clinical report and corresponding tools represent an important conceptual shift from earlier approaches to HCT, and provide a concrete framework to use for practice improvement, physician education and training initiatives.

\textit{Residency Education}

HCT curricula also have been introduced in recent years in several residency programs, including Harvard Medical \textsuperscript{21} and Indiana University School of Medicine. \textsuperscript{41} Most are in the early stages of development. In a study of primary care residents in South Carolina, Mennito et al. \textsuperscript{23} found that residents preferred the use of combined teaching modalities in HCT curricula, with clinical experience ranked as the most preferred means for information presentation. They also preferred a continuous HCT training experience throughout residency. However, there are few studies concerning effective HCT teaching models, and no published studies of programs that incorporate the new recommendation to systematically address transition among all A/YA.

Consequently, the Morsani College of Medicine at the University of South Florida Health (USF Health) developed an intervention that uses of electronic health records (EHR) as a tool to teach Pediatrics and Med-Peds residents about preparing all patients for transition to an adult care model. This approach is consistent with increasing recognition of the importance of patient
engagement in self-management and decision-making in health care, and supports Reiss' recommendation to use typical clinical encounters to facilitate involvement of A/YA in their own care. Use of the EHR has important implications because (1) all physicians are expected to start using EHR over the next few years, (2) EHR provides a mechanism for both physician education and practice improvement, (3) using EHR and information technology as an experiential learning strategy reduces the need for time-intensive didactic instruction, an important consideration for busy faculty and residents, and (4) EHR content can be replicated across systems, residency programs and practices.
Appendix B. Study Methods

Survey Methods

A pre-test/post-test survey design with comparison group was used to assess the degree to which the intervention changed resident knowledge, confidence, and experience in HCT. We invited all 67 residents (50 Pediatric and 17 Med-Peds residents) who received the intervention to complete an online self-report survey, as well as a control group of 52 graduated USF Pediatric and Med-Peds residents from the previous 5 years for whom we had an email address (obtained from our Department of Pediatrics program office).

Survey Instrument. We developed a 35-item survey (Appendix C) to measure self-reported knowledge (e.g., exposure to HCT learning activities, familiarity with HCT concepts and tasks), confidence (e.g., comfort level in providing care for YSHCN and in developing a transition plan) and experience (e.g., implementation of HCT processes and activities). Most questions were close-ended with a Likert-type response scale. We also collected general demographic information (e.g., Pediatric versus Med-Peds program, year of residency) and requested the last 4 digits of the respondent’s social security number to match pre- and post-test data. We included a final open-ended question that asked residents to share their thoughts about HCT. The survey was adapted from an instrument originally developed at the University of Kansas School of Medicine included key HCT activities outlined in the clinical report. It was reviewed by a panel of USF faculty and field tested prior to administration.

Data Collection. The questionnaire was administered through Qualtrics, a secure online survey software program. In May 2012, prior to intervention launch, the Pediatric Residency Program Associate Director sent an email and survey web link to both the intervention group (current residents) and control group (graduated residents) requesting their participation in the
10-minute survey. Reminder emails were sent weekly over one month to ensure that everyone saw the communication and had an opportunity to complete the survey. This procedure was repeated in February 2013 for the post-test, 9 months after intervention launch. While participation in the intervention was not optional for residents, participation in the survey was strictly voluntary.

Analytic Procedures. We used descriptive and correlational statistical procedures to compare pre- and post-test mean scores for the intervention and control groups across multiple dimensions of knowledge, confidence, and experience. We coded individual questions and created several composite codes. Composite scores were used to increase robustness of the analysis and facilitate more concise reporting of the data. Related questions were combined within the primary constructs (Appendix D). We eliminated three items from the analysis because the majority of residents were not exposed to the HCT tasks referenced in the questions during the intervention period.

Analytic tests were conducted for both individual and composite variables using SAS 9.3 and SPSS Statistics 21. A paired t-test was conducted to determine if any changes in pre- and post-test scores were statistically significant. To account for systematic variation between the intervention and control groups, one-way analysis of covariance (ANCOVA) was used to determine whether differences between these two groups from pre- to post-test were statistically significant. Pre-test values were used as the covariate. Effect size was estimated using Cohen’s d. When multiple comparisons were made for individual variables, p-values were adjusted via bootstrapping, in the SAS 9.3 MULTTEST Procedure. Bootstrapping was selected because it was the most appropriate method for this data, specifically the number of individual tests performed. Bonferroni adjustment would likely have been too conservative for this sample and
potentially masked a significant difference, while bootstrapping considered the correlation structures between multiple contrasts and variables.

We found assessment of the instrument’s internal reliability to be problematic. One of the most widely-used reliability estimators of psychometric tests (Cronbach’s alpha) did not imply a high level of consistency for our instrument. Calculated Cronbach’s alpha coefficients suggested that knowledge (0.51) and experience (0.38) questions had a low consistency of responses within our construct, although confidence (0.73) items were found to be consistent. We chose to include all of the questions in the analysis because each survey question represented a unique yet important attribute within the composite measure. Test-retest, another widely-used method, was not appropriate due to the potential for retest bias (e.g., for questions about having heard about HCT, read about HCT).

Survey results are reported in Chapter 2 using composite variable data. However, given the importance of better understanding specific HCT activities within the context of overall knowledge, confidence, and experience, data for individual survey questions are listed in Appendix E.

**Chart Review Methods**

To determine whether the intervention facilitated behavior change, that is, whether residents discussed HCT preparation tasks with transition-age patients, we assessed resident utilization of the EHR transition checklist. Charts of patients seen by residents in their respective continuity clinics over a period of 60 days (February 1 - March 31, 2013), were reviewed retrospectively, 9-10 months after intervention launch.

**Protocol.** Inclusion criteria for the reviews included all well visits for new and established patients ages 12 to 21, conducted by Peds and Med-Peds residents at the 3 continuity
clinics. Because the transition checklist was programmed within the adolescent text template rather than as a discrete element, our EHR systems were unable to generate utilization reports. Therefore, we manually reviewed patient visit records for each resident during the 60 day period. Study subjects (residents) and patient encounters were assigned an ID number that was used in all study data files. Patient encounter data and personal health information (PHI) extracted included patient age, gender, and presence of a SHCN (e.g., at least one chronic condition or disability). Residency data extracted from the EHR and residency program records included gender, residency program, residency year, clinic location, and EHR system. For each qualified encounter, we noted resident documentation of HCT tasks that were performed (yes/no) during the visit. The number of items to be addressed during the visit ranged from 5 to 16, based on patient age and presence of a SHCN. The data extraction protocol is listed in Appendix F.

Analytic Procedures. The unit of analysis for this portion of the study was patient visit/encounter. Each checklist item was coded individually (Appendix G). Descriptive statistics and correlation procedures using SAS 9.3 were used to calculate EHR utilization rates and associations between utilization (dependent variable) and patient or resident factors (independent variables). Fisher’s Exact and Chi-squared tests of significance were conducted for patient and resident variables. Comparison of tool utilization for each independent variable was conducted using General Linear Mixed Effect Modeling.

Interview Methods

Qualitative methods, which are often able to capture issues that cannot be captured by aggregate statistics, were used to explore and better understand resident and faculty perceptions about the intervention.42,43 We used semi-structured telephone interviews as our primary data collection method rather than focus groups or other qualitative techniques due to the scheduling
needs and time limitations of participants. Our research team collaborated throughout the data
collection and analysis process.

**Sampling and Recruitment.** We used a stratified probability sample of Pediatric and Med-
Peds residents enrolled at USF Health 9 months after intervention launch (among 50 Pediatric
and 17 Med-Peds residents) and a non-probability sample of preceptors (among 12 faculty
members). Employing a randomized, systematic selection process with a list provided by the
residency program office (residents listed alphabetically and by year), we invited 25 Pediatric
and 5 Med-Peds residents to participate in the study. A purposive sample of 6 preceptors was
selected based on experience and availability. Our sampling estimate was guided by theory of
saturation, understanding that adjustment might be required during data collection. Potential
subjects were contacted via email by the primary researcher, and residents were offered a $50
gift card to thank them for their participation.

**Instrument.** A semi-structured interview guide was developed based on our study
objectives and the RE-AIM evaluation framework The guide consisted of opened-ended
questions asking residents and faculty about their experiences and perceptions concerning the
provision of HCT services, generally, and intervention elements, specifically. Questions and
probes addressed level of experience in HCT, perceived importance of HCT service provision,
factors that influence adoption of intervention activities, frequency of utilization, organizational
barriers to implementation, perceived effect of the training, and suggestions for improvement.
Embedded within the interview protocol were effectiveness rating scales for various aspects of
the program. Most questions were framed within the context of resident adoption of HCT
activities, though preceptor adoption and support of the intervention also were addressed. Some
resident questions were modified slightly for faculty subjects. The guide was reviewed for
content validity by a USF faculty advisory panel, field tested with 2 residents, and modified for clarification. Table 6 illustrates how multilevel learning and behavior constructs were applied to the RE-AIM model, guiding development of our evaluation questions and interview protocol (Appendix H).

Data Collection. The primary researcher conducted all interviews via telephone at times that were convenient to participants; they were scheduled over 2 months in February and March 2013. Interviews lasted an average of 25 minutes each. They were digitally recorded after participants provided consent, and field notes were documented. Although this was a semi-structured process, subjects were encouraged to talk freely about their experiences and perspectives. Audiotaped interviews were transcribed verbatim using a transcription guide developed for the study, with identifying information made anonymous. All transcribed interviews were reviewed by the primary researcher for accuracy. A transcription log was created to ensure consistency and appropriate documentation.

Analysis. Transcripts were analyzed using an a priori and emergent coding system in a constant comparative, iterative process. Prior to initiating a coding process, all transcripts and field notes were printed and read twice. Coding was conducted in multiple phases. First, an a priori coding framework was generated in the MAXQDA 11 data analysis program (www.maxqda.com) using our planning model, interview protocol, and researcher notes. The primary researcher systematically coded the first 5 transcripts, adding emergent codes and continually adjusting hierarchical codes and code families throughout the process. Three transcripts (14%) were then independently coded by two other research team members to assess reliability and increase accuracy of the coding system. Team members discussed discrepancies, modified the codebook, and re-coded the transcripts until intercoder agreement scores were
acceptable and consistent (95% agreement in use of codes and 70% agreement in code application, as calculated in the MAXQDA 11 function). All transcripts were re-examined and coded using the final codebook with emerging themes (Appendix I).

The data were then grouped by common themes and organized within the RE-AIM framework (Appendix J). Responses were reviewed for commonalities, differences, frequency, extensiveness (degree of detail), and co-occurrence of codes. A comparison of coded transcripts by resident and faculty variables (Pediatrics versus Med-Peds program, gender, clinic location, resident year) was conducted to explore differences among subgroups. Descriptive summaries were developed for each theme, and participant quotes provided further evidence for interpretation and recommendations. A USF faculty advisor reviewed de-identified transcripts, coding strategies, and narrative analysis to improve accuracy of the information. The study was approved by the USF Institutional Review Board (Appendix K).
Appendix C. Survey Questions

*The web-based survey was programmed in Qualtrics and encompassed 35 response items.

Survey Introduction

According to the Maternal and Child Health Bureau, children with special health care needs (CSHCN) are those who “have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who require health and related services of a type or amount beyond that required by children generally.” Examples of youth with special health care needs (YSHCN) that might fit this definition include patients with sickle cell disease, cystic fibrosis, diabetes, autism, cerebral palsy, and Down’s syndrome.

As outlined in the AAP’s 2011 Clinical Report on transition from adolescence to adulthood, “optimal health care is achieved when each person, at every age, receives medically and developmentally appropriate care. The goal of a planned health care transition is to maximize lifelong functioning and well-being for all youth, including those who have special health care needs and those who do not. This process includes ensuring that high-quality, developmentally appropriate health care services are available in an uninterrupted manner as the person moves from adolescence to adulthood.”

Transition to adult health care is much more than transfer of care. Transition involves ongoing discussion – particularly among YSHCN and their families – about the patient’s potential for independence and decision-making, education and vocational training, and adult health care coverage and social security.

Please answer the following questions based on these definitions, as well as your own understanding of health care transition.

Section 1: Knowledge

1. How would you rate your overall knowledge of health care transition?
   - Very minimal
   - Minimal
   - Moderate
   - Extensive
   - Very extensive

2. Have you received training about health care transition?
   - I have heard about transition  
   - I have read information about transition  
   - I have attended a lecture/training session focused on transition  
   - I have assisted a patient with transition in my patient panel/continuity clinic  
   - I have assisted a patient with transition in an adolescent health care setting  
   - I have assisted a patient with transition in a subspecialty clinic

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3. What is your degree of familiarity with health care transition? Rate from 1 (not at all familiar) to 5 (very familiar)

   I am familiar with standardized transitioning resources and tools.
   I am familiar with self-management skills that youth need to develop in order to be active adult health care consumers.
   I am familiar with adult health care providers in my community
   I am familiar with health care coverage options for young adults aging out of pediatric health plans.
   I am familiar with health, social service, and legal resources for YSHCN in my community.

4. How would you prefer to learn new knowledge about health care transition?  Check all that apply

   Peer reviewed literature
   Transition website (online self search)
   Webinar/ web based module
   Didactic lectures or training sessions
   Standardized patient encounters
   Experiences transitioning youth in your own continuity clinic
   Transitioning elective or rotation through subspecialty clinics that care for YSHCN
   Other (please specify)

Section 2: Confidence

5. How comfortable are you in providing primary care for YSHCN?

   Very uncomfortable
   Uncomfortable
   Comfortable
   Very Comfortable

6. How comfortable are you in your ability to develop a coordinated, comprehensive transition plan in the context of home and community for YSHCN?

   Very uncomfortable
   Uncomfortable
   Comfortable
   Very Comfortable

Section 3: Experience

7. How would you rate your overall level of experience in transitioning adolescents from pediatric to adult care?

   Very minimal
   Minimal
   Moderate
   Extensive
   Very extensive
8. Please estimate how many adolescents you have personally assisted with transition during your residency:
   
   0
   1-2
   3-5
   6-10
   >10

9. In your experience caring for adolescents, how often do you:

   Discuss the process of transition with patients and families?
   Never
   Rarely
   Sometimes
   Often

   Encourage health care self-management skills?
   Never
   Rarely
   Sometimes
   Often

   Discuss insurance options in adulthood?
   Never
   Rarely
   Sometimes
   Often

   Develop an individualized transition plan?
   Never
   Rarely
   Sometimes
   Often

   Use standardized tools and resources when facilitating transition?
   Never
   Rarely
   Sometimes
   Often

   Communicate directly with adult health care providers to assist transition?
   Never
   Rarely
   Sometimes
   Often
Spend some time during office visits talking privately to the adolescent? (without parents/family present)?

Never
Rarely
Sometimes
Often

Section 4: Demographics

Please answer the following demographic questions:

10. What are the last 4 digits of your social security number? (used to match pre- and post-surveys)

— — — —

11. What is your residency program?

Pediatrics
Med-Peds

12. What is your residency level?

PGY1
PGY2
PGY3
PGY4
PGY5+

13. What is your anticipated post-residency specialty?

Primary Care
Hospitalist
Subspecialist
Undecided
Other (please specify)

14. Please share any additional comments that you have regarding health care transition.
### Appendix D. Survey Data Dictionary

<table>
<thead>
<tr>
<th>Question/Variable</th>
<th>Description</th>
<th>Value</th>
<th>Value Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>KnowQ1 Dependent</td>
<td>Overall knowledge of HCT</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Minimal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Extensive</td>
</tr>
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<td></td>
<td></td>
<td>5</td>
<td>Very Extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99</td>
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<tr>
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<td>Heard about HCT</td>
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<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>No</td>
</tr>
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<td></td>
<td>99</td>
<td>Missing (unanswered)</td>
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<tr>
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<td>Read information about HCT</td>
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<td>Yes</td>
</tr>
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<td>No</td>
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<td></td>
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<tr>
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<td>Attended lecture/training on HCT</td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>99</td>
<td>Missing (unanswered)</td>
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<td>KnowQ2e Dependent</td>
<td>Assisted patient with HCT in adolescent clinic</td>
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<td>Yes</td>
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<tr>
<td></td>
<td></td>
<td>99</td>
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<td>KnowQ2f Dependent</td>
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<td></td>
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<td>*Composite KnowQ2a-d Dependent</td>
<td><strong>Exposure to active learning activities in HCT</strong></td>
<td>Sum of KnowQ2a-d</td>
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<td>KnowQ3a Dependent</td>
<td>Familiar with standardized resources/tools</td>
<td>1</td>
<td>Not at all familiar</td>
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<td>2</td>
<td>Familiar</td>
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<td></td>
<td>3</td>
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<td></td>
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<td>KnowQ3b Dependent</td>
<td>Familiar with self-management skills</td>
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<td>Familiar</td>
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<td></td>
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<td>KnowQ3c Dependent</td>
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<td></td>
<td></td>
<td>2</td>
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<td></td>
<td></td>
<td>3</td>
<td>Very familiar</td>
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<td></td>
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### Appendix D. (Cont.)

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<th>Question</th>
<th>Description</th>
<th>Options</th>
<th>Scale</th>
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<tr>
<td>ConQ5</td>
<td>Comfortable providing primary care for YSHCN</td>
<td>1 Very Uncomfortable</td>
<td>2 Uncomfortable</td>
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<td>ConQ6</td>
<td>Comfortable developing a transition plan for YSHCN</td>
<td>1 Very Uncomfortable</td>
<td>2 Uncomfortable</td>
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<td>ExpQ7</td>
<td>Overall level of experience with HCT</td>
<td>1 Very Minimal</td>
<td>2 Minimal</td>
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<td>ExpQ8</td>
<td>Estimated number of patients assisted with HCT during residency</td>
<td>1 0</td>
<td>2 1-2</td>
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<td>ExpQ9a</td>
<td>How often do you discuss HCT process with patients and families</td>
<td>1 Never</td>
<td>2 Rarely</td>
</tr>
<tr>
<td>ExpQ9b</td>
<td>How often do you encourage self-management skills</td>
<td>1 Never</td>
<td>2 Rarely</td>
</tr>
</tbody>
</table>
| ExpQ9c  | How often do you discuss insurance options | 1   | Never  
2   | Rarely  
3   | Sometimes  
4   | Often  
5   | All of the time  
99  | Missing (unanswered) |
| ExpQ9d  | How often do you develop an individualized transition plan | 1   | Never  
2   | Rarely  
3   | Sometimes  
4   | Often  
5   | All of the time  
99  | Missing (unanswered) |
| ExpQ9e  | How often do you use standardized tools and resources | 1   | Never  
2   | Rarely  
3   | Sometimes  
4   | Often  
5   | All of the time  
99  | Missing (unanswered) |
| ExpQ9f  | How often do you communicate directly with adult providers | 1   | Never  
2   | Rarely  
3   | Sometimes  
4   | Often  
5   | All of the time  
99  | Missing (unanswered) |
| ExpQ9g  | How often do you spend time alone with adolescent during visit | 1   | Never  
2   | Rarely  
3   | Sometimes  
4   | Often  
5   | All of the time  
99  | Missing (unanswered) |

| ExpQ9a-g, ExpQ7  | Frequency of implementing HCT processes and activities | Sum of Exp9a –g, ExpQ7 |
| ResProg  | Residency program | Pediatrics  
2   | Med-Peds  
99  | Missing (unanswered) |
| ResYr  | Residency Level | PGY1  
2   | PGY2  
3   | PGY3  
4   | PGY4  
5   | PGY5+  
99  | Missing (unanswered) |
| ControlYr  | Control Group/Graduation Year | 2006  
2   | 2007 |

Appendix D. (Cont.)
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<tr>
<th>Res/Control Spec</th>
<th>Anticipated/current post-residency specialty</th>
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<tr>
<td>Independent</td>
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<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
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<td>Res/Control ID</td>
<td>Unique participant identifier</td>
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Appendix E. Comparison of Resident vs Control Group Survey Scores in HCT Knowledge, Confidence, and Experience (Individual Questions)

<table>
<thead>
<tr>
<th>Individual Outcome Variables</th>
<th>Resident (N=11)</th>
<th>Control (N=13)</th>
<th>Change p-value</th>
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<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre  SD Post</td>
<td>Pre  SD Post</td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall knowledge of HCT</td>
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<td>2.45 0.69 2.82 0.40</td>
<td>3.15 0.55 3.15 0.69</td>
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<tr>
<td>Heard about HCT</td>
<td>1</td>
<td>0.73 0.47 1.00 0.00</td>
<td>1.00 0.00 1.00 0.00</td>
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<tr>
<td>Read information about HCT</td>
<td>1</td>
<td>0.55 0.52 0.91 0.30</td>
<td>0.85 0.38 0.77 0.44</td>
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<tr>
<td>Attended lecture/training on HCT</td>
<td>1</td>
<td>0.09 0.30 0.64 0.50</td>
<td>0.38 0.51 0.54 0.52</td>
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<td>Assisted patient with HCT in clinic</td>
<td>1</td>
<td>0.27 0.47 0.64 0.50</td>
<td>0.85 0.38 0.77 0.44</td>
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<td>Familiar with standardized tools and resources</td>
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<td>2.00 0.82 2.73 0.65</td>
<td>2.46 0.97 3.18 1.08</td>
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<td>Familiar with self-management skills</td>
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<td>Familiar with adult health care providers</td>
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<td>Familiar with health care coverage options</td>
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<td>Familiar with health, social, legal services for YSHCN</td>
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<td>2.55 1.04 3.00 0.82</td>
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<td>Confidence</td>
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<tr>
<td>Confidence in providing primary care for YSHCN</td>
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<td>2.82 0.40 3.27 0.47</td>
<td>3.08 0.76 2.83 0.72</td>
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<td>Confidence in developing a transition plan for YSHCN</td>
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<td>2.27 0.47 2.55 0.52</td>
<td>2.92 0.64 2.85 0.55</td>
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<td>Overall level of experience with HCT</td>
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<td>3.15 0.80 2.85 0.69</td>
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<td>Frequency of discussing insurance options</td>
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<td>Frequency of developing individualized HCT plan</td>
<td>5</td>
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<td>2.92 1.32 2.75 1.29</td>
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<td>Frequency in using standardized tools and resources</td>
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<td>2.08 1.04 2.15 1.21</td>
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<td>Frequency of communicating with adult providers</td>
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<td>Frequency of spending time alone with adolescent during visit</td>
<td>5</td>
<td>3.73 1.49 4.45 0.69</td>
<td>4.17 1.53 4.42 0.90</td>
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</tbody>
</table>

Response scales for maximum score of 1 (0=No, 1=Yes), 4 (1=Low to 4=High) and 5 (1=Low to 5= High)
Appendix F. Chart Review Protocol

Research Objectives: 1) Determine whether the intervention prompted Pediatric and Med-Peds residents to discuss and document HCT preparation tasks with transition-age patients (EHR utilization), and 2) identify differences or associations between EHR utilization rates and factors associated with the resident, patient or clinic.

Design: This is a retrospective chart review

Inclusion Criteria: All well child visits during the month of February and March 2013 that were administered by Pediatric and Med-Peds residents in USF continuity clinics (17 Davis Blvd, South Tampa Center, HealthPark) for new and established patients ages 12-21.

Reviewer: Janet Hess

Dates to be reviewed: 2/1 – 3/31/13

Patient Data Extracted: Patient age, gender, ethnicity, presence of at least one chronic medical condition.

Clinic Location/EHR Systems: Allscripts (17 Davis Blvd, STC) and Epic (HealthPark)

**Resident Data:** Resident information will be collected from the Residency Program office and merged into the database: gender, residency type, year of residency

Setting: Chart review will be conducted in USF offices and an affiliated Tampa General Hospital site, HealthPark.

Confidentiality: Study subjects (patients and residents) will be assigned a study ID number by the PI, to be used in all study data files. Only research team members will have access to identifying data.

Statistical Analysis: Summary statistics will be calculated for documented utilization of the EHR transition checklist. Chi square tests and multiple regression analyses will be conducted to determine whether there is an association between EHR utilization (dependent variable) and independent factors such as patient age and gender, clinic location, particular resident, residency program year, etc.
### Appendix G. Chart Review Data Dictionary

<table>
<thead>
<tr>
<th>Variable Name Type</th>
<th>Variable Description</th>
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<th>Value Label</th>
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<tr>
<td><strong>EMR Independent</strong></td>
<td>EMR System</td>
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<td></td>
<td></td>
<td>1</td>
<td>Epic</td>
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<td><strong>Clin Independent</strong></td>
<td>Clinic location</td>
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<td>17 Davis Blvd.</td>
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<tr>
<td></td>
<td></td>
<td>2</td>
<td>South Tampa Ctr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>HealthPark</td>
</tr>
<tr>
<td><strong>PatAge Independent</strong></td>
<td>Patient Age (Numeric)</td>
<td>Recode:</td>
<td>Recode:</td>
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<tr>
<td></td>
<td></td>
<td>1</td>
<td>12-14 years</td>
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<td></td>
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<td>2</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>18-21 years</td>
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<tr>
<td><strong>PatDx Independent</strong></td>
<td>Patient has 1 or more chronic health condition</td>
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<td></td>
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<td>Yes</td>
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</tr>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>PGY5+</td>
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<td>Unique identifier for resident</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PatID</strong></td>
<td>Unique identifier for patient encounter</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td>Date of patient encounter</td>
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**Resident addressed:**

<table>
<thead>
<tr>
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<th>Resident addressed at least 1 item in HCT tool</th>
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<th>Value Label</th>
</tr>
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<tr>
<td></td>
<td></td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>E1 Dependent</strong></td>
<td>12-14 patient can name his/her chronic conditions</td>
<td>0</td>
<td>No</td>
</tr>
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<td></td>
<td></td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>E2 Dependent</strong></td>
<td>12-14 patient can name his/her allergies</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>E3 Dependent</strong></td>
<td>12-14 patient can name his/her medications</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>E4 Dependent</strong></td>
<td>12-14 patient answers questions asked by provider</td>
<td>0</td>
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</tr>
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<td></td>
<td></td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>E5 Dependent</strong></td>
<td>12-14 patient asks questions of provider</td>
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<td></td>
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<td><strong>E6 Dependent</strong></td>
<td>Discussed keeping a personal health care record with 12-14 patient</td>
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<td></td>
<td></td>
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</tr>
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<td><strong>E7SN</strong></td>
<td>Family is working with 12-14 YSHCN to help</td>
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### Appendix G. (Cont.)

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<th>Code</th>
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<td>E8SN</td>
<td>them be independent</td>
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<td>No</td>
<td>12-14 YSHCN has attended an IEP meeting</td>
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<td>12-14 YSHCN’s IEP includes health care self-management activities</td>
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</tr>
<tr>
<td>E10SN</td>
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<td>No</td>
<td>12-14 YSHCN has applied for APD/MedWaiver</td>
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<tr>
<td>E11SN</td>
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<td>Subspecialty providers for 12-14 patient</td>
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<tr>
<td>M1</td>
<td>15-17 patient can describe how his/her chronic conditions impact health</td>
<td>0</td>
<td>No</td>
<td>15-17 patient can describe how his/her chronic conditions impact health</td>
</tr>
<tr>
<td>M2</td>
<td>15-17 patient can describe how his/her medications impact health</td>
<td>0</td>
<td>No</td>
<td>15-17 patient can describe how his/her medications impact health</td>
</tr>
<tr>
<td>M3</td>
<td>15-17 patient can take medications without supervision</td>
<td>0</td>
<td>No</td>
<td>15-17 patient can take medications without supervision</td>
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<tr>
<td>M4</td>
<td>15-17 patient has tried to refill a medication</td>
<td>0</td>
<td>No</td>
<td>15-17 patient has tried to refill a medication</td>
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<tr>
<td>M5</td>
<td>15-17 patient has scheduled a doctor appt</td>
<td>0</td>
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<td>15-17 patient has scheduled a doctor appt</td>
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<td>M6</td>
<td>15-17 patient meets with provider privately</td>
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<td>No</td>
<td>15-17 patient meets with provider privately</td>
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<tr>
<td>M7</td>
<td>15-17 patient is keeping health care summary</td>
<td>0</td>
<td>No</td>
<td>15-17 patient is keeping health care summary</td>
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<tr>
<td>M8</td>
<td>15-17 patient knows source of health insurance</td>
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<td>15-17 patient knows source of health insurance</td>
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<tr>
<td>M9</td>
<td>15-17 patient/family investigating adult doctors for primary and specialty care</td>
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<td>No</td>
<td>15-17 patient/family investigating adult doctors for primary and specialty care</td>
</tr>
<tr>
<td>M10</td>
<td>15-17 patient/family are investigating secondary education, vocational opportunities</td>
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<td>No</td>
<td>15-17 patient/family are investigating secondary education, vocational opportunities</td>
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<td>M11</td>
<td>15-17 patient received <em>10 Steps To Successful HCT</em> handout</td>
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<td>15-17 patient received <em>10 Steps To Successful HCT</em> handout</td>
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<tr>
<td>M12SN</td>
<td>15-17 YSHCN’s IEP includes health care self-management/transition activities</td>
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<td>M13SN</td>
<td>15-17 YSHCN applied for APD/MedWaiver</td>
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<td>15-17 YSHCN applied for APD/MedWaiver</td>
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<tr>
<td>M14SN</td>
<td>15-17 patient has begun Voc Rehab application</td>
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<td>M15SN</td>
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<td>M16SN</td>
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<td>Subspecialty providers for 15-17 patient</td>
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<td>YA1</td>
<td>18-21 patient selected adult doctors for primary and specialty care</td>
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<td>No</td>
<td>18-21 patient selected adult doctors for primary and specialty care</td>
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<td>YA2</td>
<td>18-21 patient can refill own medication</td>
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<td>No</td>
<td>18-21 patient can refill own medication</td>
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<tr>
<td>YA3 Dependent</td>
<td>18-21 patient health insurance</td>
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</tr>
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<td>YA4 Dependent</td>
<td>18-21 patient received insurance guide</td>
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<td>Transfer Summary for 18-21 patient forwarded to new providers</td>
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<td>YA6SN Dependent</td>
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<tr>
<td>YA7SN Dependent</td>
<td>18-21 YSHCN has applied for adult SSI</td>
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<td>18-21 YSHCN has applied for Voc Rehab</td>
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<tr>
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<td>YA10SN Dependent</td>
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<td>Have/will verbally communicate with new provider for 18-21 YSHCN</td>
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<tr>
<td>YA12SN Dependent</td>
<td>Subspecialty providers for 18-21 YSHCN</td>
<td>0</td>
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Appendix H. Interview Protocols

Resident Interview Protocol

Note: Resident interview questions refer to electronic records as “EMR” rather than “EHR” since that term is used more frequently within USF College of Medicine.

1. What year of residency are you in?

2. Are you in the Pediatrics or Med-Peds program?

3. Which continuity clinic do you work in?

4. Let’s first talk about your experience in preparing adolescents for transition from pediatric to adult care prior to starting your residency. Can you describe that for me?

   Probe: Did you have experience working with YSHCN? Did you transfer any patients to an adult provider?

   Follow-up: So, on a scale of 1 to 5, with 1 being the least and 5 the most, how would you rate your pre-residency experience level in providing transition services?

      1 Very minimal
      2 Minimal
      3 Moderate
      4 Extensive
      5 Very extensive

5. How about your experience level today in preparing patients for transition? Can you describe that for me?

   Probe: If different from pre-residency, what and how has it changed?

   Follow-up: So, on a scale of 1 to 5, with 1 being the least and 5 the most, how would you rate your current experience level in providing transition services?

      1 Very minimal
      2 Minimal
      3 Moderate
      4 Extensive
      5 Very extensive

6. Let’s talk about the value of providing transition services. From your perspective, how important is it for physicians to prepare their patients for transition to adult-based health care?

   Probe: Why? Is transition preparation a valid, relevant need? To what extent do you think physician-driven transition preparation activities will lead to better health outcomes for patients in adulthood? How important is it for all patients versus for YSHCN? Are there particular transition activities that are more important than others for physicians to address?
Follow-up: So, on a scale of 1 to 5, with 1 being the least and 5 the most, how important do you think it is for physicians to provide transition services?

1. Unimportant
2. Not very important
3. Somewhat important
4. Important
5. Very important

7. In your experience, is there was a particular group or type of patient that you find it more difficult to plan for transition?
   
   **Probe:** Foster system, DJJ

We’ll switch now to talking about the transition training activities that were introduced to Peds and Med-Peds residents. That includes presentations at resident noon conference, the EMR transition task list, GAPS screener questions on transition, Transition 2 Go briefs, and other educational materials/patient handouts.

8. What do you think was the most useful in teaching residents about transition preparation?
   
   **Probe:** Why/how was it more useful than other activities?

   *Now I’m going to go through each of the activities and I’d like you to talk about your impressions of the activity.*

9. First, what did you think about the introductory presentation at the noon conference?

   **Probe:** Did you attend a noon conference? If not, did you access the recorded video on Moodle? Was it helpful/valueable/useful to have background information and context concerning transition? Were training components explained adequately?

10. Let’s talk now about the EMR transition checklist/template for adolescent patients (ages 12-21) during well-child adolescent patient visits. Can you describe when/ how frequently you use the EMR checklist for your adolescent patients?

   **Probe:** Do you always document responses in the EMR? If not, why?

   *Follow-up:* So, would you say that you use the EMR transition tool:

   - Always
   - Usually
   - Sometimes
   - Never

11. Can you talk about factors that influence whether and how often you use the EMR transition checklist?
Appendix H (Cont.)

*Probe:* Age of the patient, time limitations, degree of ease or difficulty in accessing and using the template, consequences for not using the template, motivating factors for using it?

12. Can you describe the extent to which you address the full list of tasks/activities in the EMR checklist?

*Probe:* Do you address all items or just selected items? Are there items in the checklist that you address more or less frequently? If yes, which ones and why? Are there some items you feel are more important than others?

13. Can you describe any problems you’ve experienced with EMR tasks/activities?

*Probe:* Are there items in the checklist that are unclear or you don’t feel prepared to address? Do you feel any of the activities are inappropriate or unnecessary? If so, what?

14. Let’s talk about the GAPS Screener now. To what extent do you engage in transition discussions as a result of the 5 transition questions that are now included in the GAPS?

*Probe:* What determines whether/which GAPS items you discuss with patients? Have patients specifically asked about the transition items?

15. How useful are the “Transition 2 Go” information briefs?

16. How adequate are patient resources and educational materials, such as the FloridaHATS website, printed insurance guide and 10 Steps handout?

*Probe:* Which resources or materials do you find especially useful? If so, which ones and why? How do you access them? What types of resources are missing?

17. What are the most effective ways for you to receive updates on new transition materials and information?

*Probe:* Email, communication through chief residents, noon conference, Moodle

18. To what extent do your attending physicians engage adolescent patients in transition discussions?

*Probe:* Do they use the transition tools (EMR checklist and GAPS)?

19. To what extent do attending physicians encourage you to discuss transition and use the transition tools (EMR, GAPS)?

20. To what extent is the implementation of the transition preparation protocol consistent with other policies and clinical activities at USF Health?

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Appendix H (Cont.)

_Probe:_ Does the protocol conflict with other policies? Are there organizational barriers to implementation? Do you think it is (or would be) supported at all levels?

21. So, given everything we’ve just discussed, and on a scale of 1 to 5 with 1 being the least and 5 the most, how effective are the training components in preparing Peds and Med-Peds providers to transition their adolescent patients?

- Not effective at all
- Mostly ineffective
- Adequate
- Mostly effective
- Very Effective

22. What suggestions do you have for improving transition training in the residency program?

23. Do you have any further questions, comments, concerns, or stories you would like to share?
Appendix H (Cont.)

Faculty Interview Protocol

1. First, let’s talk about the value of providing transition services. From your perspective, how important is it for physicians to prepare their patients for transition to adult-based health care?

   *Probe:* Why? Is transition preparation a valid, relevant need? To what extent do you think physician-driven transition preparation activities will lead to better health outcomes for patients in adulthood? How important is it for all patients versus for YSHCN? Are there particular transition activities that are more important than others for physicians to address?

   *Follow-up:* So, on a scale of 1 to 5, with 1 being the least and 5 the most, how important do you think it is for physicians to provide transition services?

   1. Unimportant
   2. Not very important
   3. Somewhat important
   4. Important
   5. Very important

2. In your experience, is there a particular group or type of patient that you find it more difficult to plan for transition?

   *Probe:* Foster system, DJJ

   Let’s talk now about the transition training activities recently introduced. That includes presentations at resident noon conferences, EMR transition task list, the GAPS screener questions on transition, Transition 2 Go briefs, and other educational materials/patient handouts.

3. What do you think was the most useful in teaching residents about transition preparation?

   *Probe:* Why/how was it more useful than other activities?

   Now, I’m going to go through each of the activities and I’d like you to talk about your impressions of the specific activity.

4. First, consider the EMR transition checklist/template for adolescent patients (ages 12-21) during well-child adolescent patient visits. When/how frequently would you say that Peds and Med-Peds providers (both residents and faculty) use the EMR checklist for adolescent patients?

   *Probe:* Difference among residents versus faculty? If so, why? Do providers usually document responses in the EMR? If not, why?

   *Follow-up:* So, would you say that the EMR transition tool is used by providers:

   - Always
   - Usually
   - Sometimes
   - Never
Appendix H (Cont.)

5. From your perspective, what factors influence whether and how often providers use the EMR transition checklist?

*Probe:* Age of the patient, time limitations, degree of ease or difficulty in accessing and using the template, residency year, consequences for not using the template, motivating factors for using it?

6. To your knowledge, to what extent do providers address the full list of tasks/activities in the EMR checklist?

*Probe:* Do they address each item or selected items only? Are there specific items in the checklist that they address more or less frequently? If yes, which ones and why? Are there some items they feel are more important than others?

7. Can you identify any problems addressing the tasks/activities?

*Probe:* Are there items in the checklist that are unclear or that providers don’t feel prepared to address? Are any of the activities inappropriate or unnecessary? If so, what?

8. Let’s talk about the GAPS Screener now. To your knowledge, to what extent do providers engage in transition discussions as a result of the 5 transition questions that are now included in the GAPS?

*Probe:* What determines which GAPS items are discussed with patients? Have patients specifically asked about the transition items?

9. How useful are the “Transition 2 Go” information briefs to providers?

10. How adequate are patient resources and educational materials, such as the FloridaHATS website, printed insurance guide and 10 Steps handout?

*Probe:* Which resources or materials are especially useful for providers? If so, which ones and why? How are materials accessed? What types of resources are missing?

11. What are the most effective ways for providers to receive updates on new transition materials and information?

*Probe:* Best way for residents? Best way for faculty?

12. To what extent do you (personally) engage adolescent patients in transition discussions?

*Probe:* Do you use the transition tools (EMR checklist and GAPS)?
Appendix H (Cont.)

13. To what extent do you encourage residents to discuss transition and use the transition tools (EMR, GAPS)?
14. To what extent is the implementation of the transition preparation protocol consistent with other policies and clinical activities at USF Health?

Probe: Does the protocol conflict with other policies? Are there organizational barriers to implementation? Do you think it is (or would be) supported at all levels?

15. So, given everything we’ve just discussed, and on a scale of 1 to 5 with 1 being the least and 5 the most, how effective are the training components in preparing providers to transition their adolescent patients?

- Not effective at all
- Mostly ineffective
- Adequate
- Mostly effective
- Very Effective

16. What suggestions do you have for improving transition training for Peds and Med-Peds providers?

Probe: Should strategies or methods be different for residents versus faculty?

17. Do you have any further questions, comments, concerns, or stories you would like to share?
Appendix H (Cont.)

_Pilot Interview Questions_

_Interviewer:_ I’m also interested in the wording and format of this questionnaire. I want to make sure I’m on the right track as I interview others, and would like to know whether you have any suggestions to improve the questions.

1. Overall, do you think others like you would feel comfortable answering the questions in this interview?

   _Probe:_ Do you think residents will feel free to answer honestly, or do you think they’ll feel pressured to provide favorable feedback, particularly since I’m involved in development of the program? If the latter, is there anything that would help residents answer more freely? Should questions be structured differently?

2. Are the questions fairly easy and straightforward?

3. Are there any questions or terms that were confusing to you or made you uncomfortable?

4. Is the length of the interview okay for you?

   _Thank you so much for your time today. I appreciate your willingness to share your experiences._
## Appendix I. Interview Coding System

### Resident Education in HCT: Interview Code System

#### RE-AIM Evaluation Framework Color Code

<table>
<thead>
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<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Reach</td>
</tr>
<tr>
<td>Yellow</td>
<td>Effectiveness</td>
</tr>
<tr>
<td>Blue</td>
<td>Adoption</td>
</tr>
<tr>
<td>Purple</td>
<td>Implementation</td>
</tr>
<tr>
<td>White</td>
<td>Maintenance (NA)</td>
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</tbody>
</table>

* Maintenance not coded in interview transcripts

<table>
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<tr>
<th>Intervention/Components</th>
<th>Description</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
<th>Typical Exemplars</th>
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</thead>
<tbody>
<tr>
<td>GAPS</td>
<td>Adapted version of the Guidelines for Adolescent Preventive Services (GAPS) from the American Medical Association. The GAPS screener is typically filled out by the patient or parent in the waiting room prior to the office visit. Physicians use the GAPS to identify &quot;red flags&quot; and/or to initiate discussion about important issues in adolescent health. For the intervention, a modified version of the GAPS included 5 HCT-related questions about health care self-management.</td>
<td></td>
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<tr>
<td>Patient Resources</td>
<td>Printed HCT educational materials developed by FloridaHATS, distributed to each USF resident continuity clinic. Includes Just the Facts insurance guide and 10 Steps to Successful Health Care Transition</td>
<td></td>
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</tr>
<tr>
<td>FloridaHATS Website</td>
<td>Statewide clearinghouse of HCT resources for adolescents and young adults, families, caregivers, and providers; includes a Health Services Directory for Young Adults</td>
<td></td>
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<tr>
<td>T2G</td>
<td>&quot;Transition 2 Go,&quot; a series of web-based informational briefs designed to educate health care providers and patients about community resources that can support smooth HCT. Topics to-date include Vocational Rehabilitation Services, Medicaid Waivers, Guardianship and Health Insurance.</td>
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</tbody>
</table>
### Appendix I (Cont.)

| Intervention/Components (continued) | EMR | Description: Electronic medical records (EMR). The USF EMR systems (Allscripts and Epic) include an age-specific checklist of HCT tasks for physicians to address with all of their adolescent and young adult patients. Questions are to be addressed with patients in annual well-child visits, and include additional tasks for YSHCN.  

| Noon Conference | Description: A 45-minute didactic presentation about HCT and the training program that was presented twice at regularly scheduled resident "Noon Conferences." Due to conflicts with resident rotations and clinical schedules, attendance at Noon Conferences is not required but encouraged (e.g., among 67 residents, a typical Noon Conference might have 15-20 in attendance). The HCT presentations were recorded and posted on Moodle for those who could not physically attend.  

| Moodle | Description: An online learning site that USF Health uses for course materials; all HCT intervention materials were posted on Moodle and accessible to all residents.  

| Experience in HCT | Description: Report of HCT services and activities that residents have engaged in with patients Inclusion Criteria: HCT-related experience both before residency at USF (e.g., medical school) and during residency  

| Exclusion Criteria: Activities unrelated to HCT  

| Typical Exemplars: We encourage patients to take charge of their health and establish care with adult doctors  

| Atypical Exemplars: We encourage HPV vaccinations  

| Pre-Res Exp | Description: HCT experience prior to starting Residency program  

| Current Exp | Description: Current level of experience in providing HCT services  

| Importance of HCT | Description: Value of physicians providing health care transition (HCT) services to adolescents and young adults Inclusion Criteria: Perceived degree of importance in having physicians address HCT-related activities or tasks with their patients; references to activities for all patients and/or those with special health care needs, improved health outcomes due to HCT services, etc.  

| Exclusion Criteria: Physician-driven activities or services that are not related to HCT  

| Typical Exemplars: Value of encouraging healthy teens/YSHCN to take responsibility for their health care, to secure health insurance in young adulthood, to communicate directly with their physician; positive outcomes can result from HCT services and/or negative outcomes can result from lack of HCT services  

| Atypical Exemplars: Value of providing vaccinations, preventive services  

|
### Appendix I (Cont.)

<table>
<thead>
<tr>
<th>Description</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
<th>Typical Exemplars</th>
<th>Atypical Exemplars</th>
<th>Close but no</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Usefulness/Value</strong></td>
<td>Perceived importance, value of intervention activities or actions</td>
<td>Value of the intervention as a whole, or of specific components and activities related to the training program; includes both positive (useful, important, beneficial, necessary) and negative (unnecessary, redundant, impractical) perceptions and opinions about what is useful</td>
<td>Value of physicians, in general, providing HCT services to patients</td>
<td>It's not as important to include HCT tasks in the EMR for younger teens; we need to have all of the EMR questions in the checklist; it's important for our Attendings to enforce HCT activities</td>
<td>Ease of use, effectiveness, convenience</td>
</tr>
<tr>
<td><strong>Effectiveness</strong></td>
<td>The degree to which the training program achieved its intended objectives, i.e., changed resident knowledge, attitudes, practice</td>
<td>Perception that residents did or did not understand the importance of HCT; did or did not appropriately address HCT with all transition-age patients; activities that &quot;work&quot;</td>
<td>Expectation of achieving outcomes outside the scope of the program</td>
<td>On a scale from 1 to 5, the program rated 3.5 in effectiveness; email (as a communication tool) works</td>
<td>Remarks about problems with the program</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>How often/frequently an activity occurs, action is carried out, intervention component is utilized</td>
<td>Perceptions about the number of times an activity occurs, from many (high) to few (little or no) times; within the context of frequency, includes &quot;degree to which&quot; an action occurs or &quot;level&quot; of activity; range includes &quot;always,&quot; &quot;usually,&quot; sometimes,&quot; &quot;never&quot;</td>
<td>Quality of intervention components</td>
<td>Attending physicians vary in the degree to which they use the HCT EMR checklist; I always document in the EMR what’s been discussed in a visit; I didn’t attend any Noon Conferences</td>
<td>Remarks about importance or value of program components</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Value, usefulness</td>
</tr>
</tbody>
</table>
| Utilization Factors     | **Description**: Factors that influence the degree to which residents adopt intervention activities  
**Inclusion Criteria**: Interpersonal or external factors that contribute to greater or less use of intervention components; includes both positive and negative impact, motivators, facilitators and barriers; answers the question of "why" the intervention is being used or not used.  
**Exclusion Criteria**: Factors not associated with utilization  
**Typical Exemplars**: Encouragement or reminders from attending physicians; familiarity with the intervention component or materials; time constraints during office visits  
**Atypical Exemplars**: How often the intervention is utilized  
**Close but no**: Effectiveness, value, frequency |
<table>
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<tbody>
<tr>
<td>Patient Medical</td>
<td><strong>Description</strong>: Presence or absence of a medical condition (chronic or acute) in patients; includes references to using/not using the intervention based on the patient having special health care needs, or using/not using the HCT EMR checklist during sick visits</td>
</tr>
<tr>
<td>Condition</td>
<td></td>
</tr>
<tr>
<td>Organizational</td>
<td><strong>Description</strong>: Degree of support or infrastructure within USF Health to adopt and implement the intervention, e.g., lack of enough laptops in clinics for residents; nurses forget to give patients the GAPS screener (and so residents can’t address patient responses)</td>
</tr>
<tr>
<td>Support</td>
<td></td>
</tr>
<tr>
<td>Reminders</td>
<td><strong>Description</strong>: Degree that HCT services, tasks, activities require reminders to be completed, possibly due to the newness or volume of activities; e.g., &quot;you need to remind us so we remember it all&quot;, &quot;it serves as a good reminder&quot;, &quot;nurses can help remind us&quot;, &quot;nurses forget to give patients the GAPS&quot;</td>
</tr>
<tr>
<td>Ease of Use</td>
<td><strong>Description</strong>: Degree of ease or difficulty in using, adopting, implementing components; encompasses clarity of content and instructions, as well as user proficiency in ability to complete activities</td>
</tr>
<tr>
<td>Awareness/Familiarity</td>
<td><strong>Description</strong>: Awareness about, exposure to, or knowledge of a particular intervention component, activity, e.g., intervention wasn’t used because the resident wasn’t aware of it</td>
</tr>
<tr>
<td>Time Constraints</td>
<td><strong>Description</strong>: Limited time to complete intervention tasks, e.g., limited time in office visits, or inability to attend a Noon Conference due to busy schedule</td>
</tr>
<tr>
<td>Patient Age/Maturity</td>
<td><strong>Description</strong>: Age or maturity level of the adolescent/young adult patient; the degree to which an intervention activity is used or completed based on patient’s age or maturity</td>
</tr>
<tr>
<td>Comfort</td>
<td><strong>Description</strong>: Comfort or discomfort in addressing or discussing a topic or issue with a patient, e.g., uncomfortable talking to a patient about insurance because there are few insurance options available, or due to lack of experience</td>
</tr>
<tr>
<td>Consistency</td>
<td><strong>Description</strong>: Degree of uniformity in procedures or activities; degree of variation</td>
</tr>
<tr>
<td>Accessibility</td>
<td><strong>Description</strong>: Availability; ease or difficulty in obtaining; degree of visibility, convenience</td>
</tr>
<tr>
<td>Role of Physician</td>
<td><strong>Description</strong>: Scope of physician responsibilities</td>
</tr>
<tr>
<td>Support System</td>
<td><strong>Description</strong>: Degree to which a patient has family, community, or social supports to help them as they approach adulthood</td>
</tr>
<tr>
<td>Attending Enforcement</td>
<td><strong>Description</strong>: Degree to which Attending Physicians or Chief Residents direct, model, remind or encourage residents to use the intervention, e.g., &quot;attendings just need to enforce it more.&quot;</td>
</tr>
</tbody>
</table>
## Appendix I (Cont.)

| Communication | **Description**: Communication channels to disseminate, receive information about the intervention or other activities  
**Inclusion Criteria**: Ways that are particularly good and/or bad for receiving information, guidance about the HCT training program; preferred methods  
**Exclusion Criteria**: Remarks about complexity of the material  
**Typical Exemplars**: Email is overwhelming; it’s better to have Attending Physicians remind us at the start of clinic. |
| Clinic | **Description**: Sample materials, directions, reminders in the clinic’s resident room; posted notes on clinic bulletin board or clinic computers |
| Email | **Description**: Information sent electronically via email |
| Attending/Chief Resident | **Description**: Communication, direction from Attending Physicians or Chief Residents; encompasses communication via regularly scheduled resident meetings, verbal guidance, and/or email. |
| Improvement | **Description**: Recommendations, ways to improve intervention components and activities  
**Inclusion Criteria**: Suggestions for making activities easier, more accessible, more effective  
**Exclusion Criteria**: Remarks about how the intervention doesn’t need any changes  
**Typical Exemplars**: Chief Residents should be more involved in the intervention  
**Atypical Exemplars**: I think it’s fine the way it is.  
**Close but no**: Remarks about intervention components that are confusing |
Appendix J. Interview Code and Category Frequencies

*n= number of coded text passages

Reach
Intervention/Components
  FloridaHATS web site (n=6)
  GAPS (n=22)
  Patient Resources (n=33)
  EMR (n=51)
  T2G (n=10)
  Noon Conference (n=27)
  Moodle (n=14)

Effectiveness
Importance of HCT (n=34)
Experience in HCT
  Pre-Residency Experience (n=16)
  Current Experience (n=18)
Frequency (n=82)
Usefulness/Value (n=57)
Effectiveness (n=24)

Adoption
Utilization Factors
  *Role of Physician (n=8)
  *Support System (n=8)
  Patient Medical Condition (n=41)
  *Reminders (n=19)
  Ease of Use (n=16)
  Accessibility (n=23)
  Awareness/Familiarity (n=38)
  Patient Age/Maturity (n=23)
  Attending Enforcement (n=32)
  *Consistency (n=9)
  Time Constraints (n=38)
  *Comfort (n=6)
  Organizational Support (n=34)
Communication (n=6)
  Clinic (n=10)
  Email (n=20)
  Attending/Chief Resident (n=12)

Implementation
Improvement (n=42)

*Emergent theme
Appendix K. USF IRB Approval

April 24, 2012

Janet Hess, MPH
Department of Pediatrics
2 Tampa General Circle, 5th fl.
Tampa, FL 33606

RE: Expedited Approval for Initial Review
IRB#: Pro00007273
Title: Health Care Transition in Pediatric Resident Training

Dear Ms. Hess:

On 4/17/2012 the Institutional Review Board (IRB) reviewed and APPROVED the above referenced protocol. Please note that your approval for this study will expire on 4/17/2013.

Approved Items:
Protocol Document:
Health Care Transition in Pediatric Residency Training

Consent Document:
Your study qualifies for a waiver of the requirements for the documentation of informed consent for the online survey as outlined in the federal regulations at 45CFR46.117 (c) which states that an IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds either: (1) that the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject’s wishes will govern; or (2) that the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:
Appendix K (Cont.)

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

V. Jorgensen, M.D.

E. Verena Jorgensen, M.D., Chairperson
USF Institutional Review Board
May 15, 2012

Janet Hess
Pediatrics
2 Tampa General Circle
Tampa, FL 33606

RE: Approved Amendment Request
IRB#: MS1_Pro00007273
Title: Health Care Transition in Pediatric Resident Training

Dear Ms. Hess:

On 5/14/2012, the Institutional Review Board (IRB) reviewed and approved your Amendment by expedited review procedures.

The submitted request has been approved from date: 5/14/2012 to date: 4/17/2013 for the following:

The study team is changing the research design to add a control group, which will be used for pre/post group comparison. The control group is comprised of graduated USF Peds and Med-Peds residents from the last five years (2007-2011).

Protocol Document(s):

HCT in Pediatric Residency Training- Amended Protocol(0.01)
HCT in Pediatric Residency Training (0.11)

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

[Signature]

E. Verena Jorgensen M.D., Chairperson
USF Institutional Review Board
January 18, 2013

Janet Hess
Pediatrics
2 Tampa General Circle
5th Floor, Dept of Pediatrics
Tampa, FL 33606

RE: Approved Amendment Request
IRB#: MS2_Pro00007273
Title: Health Care Transition in Pediatric Resident Training

Dear Ms. Hess:

On 1/17/2013 the Institutional Review Board (IRB) reviewed and approved your Amendment by expedited review procedures.

The submitted request has been approved from date: 1/17/2013 to date: 4/17/2013 for the following:

1. Change in study staff:
   (A) Addition of Russell Kirby as a co-investigator
   (B) Addition of Jennifer Marshall as key personnel
2. New anticipated end date of 5/31/13
3. Change in study locations: Addition of TGH, COPH, USF Medical Clinics South, and USF Ambulatory Clinics. Ancillary approval letter from TGH provided.
4. Change in recruitment:
   (A) Change in population: Addition of faculty
   (B) Interviews: A random sample of 25 Pediatric residents and 5 Med-Peds residents along with a non-probability sample of 5 faculty members will receive a study recruitment email and phone call from the PI in February 2013. Faculty selection will be based on availability and continuity clinic schedules. Email and phone calls (or phone message) will be administered concurrently. Non-respondents to the initial interview recruitment messages will receive a 2nd email and call the next week. If there is still no response for a potential subject after 2 weeks and we need more subjects for the sample, we will randomly select additional potential participants from the resident roster and use the same recruitment procedure.
   (C) Change in compensation: Residents will receive a $50 gift card for participation
5. Change in procedures/instruments:
   (A) The research is now being conducted for purposes of the PI's dissertation
   (B) Addition of audiotaped telephone interviews of residents and faculty members; New
Appendix K (Cont.)

interview scripts for faculty and residents
(C) Review of patient medical records for well child visits administered by residents at the 3 residency continuity clinics during the month of 2/2013 for new and established patients ages 12-21.
6. Change in consent process/forms:
(A) Waiver of documentation of informed consent for telephone interviews
(B) New verbal consent script for phone interviews
(C) Waiver of the informed consent process for chart/record reviews
7. Waiver of HIPAA authorization for patient chart reviews
8. Revised protocol, amendment 2, 12/21/12

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

[Signature]
John Schinka, PhD, Chairperson
USF Institutional Review Board
3/27/2013

Janet Hess, M.P.H.
Pediatrics
2 Tampa General Circle
5th Floor, Dept of Pediatrics
Tampa, FL 33606

RE: Expeditied Approval for Continuing Review
IRB#: CR2_Pro00007273
Title: Health Care Transition in Pediatric Resident Training

Study Approval Period: 4/17/2013 to 4/17/2014

Dear Ms. Hess:

On 3/26/2013, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents outlined below.

Approved Item(s):
Protocol Document(s):
HCT in Peds Training Amendment 3 Protocol

Consent/Assent Document(s)*:
Verbal consent form for telephone interviews, v3 dated 3/25/13

The waiver of documentation of informed consent has been renewed.

The IRB determined that your study qualified for expedited review based on federal expedited category number(s):

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.
Appendix K (Cont.)

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

[Signature]

John Schinka, Ph.D., Chairperson
USF Institutional Review Board
Appendix L. Tampa General Hospital IRB Approval

Monday, January 14, 2013

Janet Hess (doctoral candidate)
USF Department of Pediatrics
2 Tampa General Circle, 5th Floor
Tampa, FL 33606

RE: Health Care Transition in Pediatric Resident Training
IRB #: PRO00007273

Dear Janet Hess:

The above referenced request for access to data/PHI from Tampa General Hospital has been reviewed and approved by the Office of Clinical Research, pending the approval of the USF Institutional Review Board, and your credentialing to be completed. Please forward a copy of the IRB approval to the Office of Clinical Research upon receipt. Once the project begins, please note that you have five years from the date of IRB approval to complete your data collection.

If you need additional time to complete your collection, a written request must be made to our offices; however, TGH reserves the right to terminate the study at any time if necessary. It is the responsibility of the Principal Investigator to guarantee appropriate measures to maintain confidentiality of this data. It is also the Principal Investigator’s responsibility to ensure all involved TGH staff are informed and aware of the details of the study.

Any financial or other Conflict of Interest from any study team member that may arise during the course of this research study must be disclosed and reported to the Office of Clinical Research and the IRB.

Please forward a copy of all IRB decisions (including all future protocol changes, amendments, changes in study personnel, progress reports) to the Office of Clinical Research at Tampa General Hospital. Thank you.

Sincerely,

Beth Kohl, MS, MPH
Manager, Office of Clinical Research

cc: Sally Houston, MD, TGH Chief Medical Officer
Cheryl Byers, USF Division of Research Integrity and Compliance
Corinne Walters, USF Health Sponsored Research Administrator
TGH File