

A Public Health Approach to Pediatric Residency Education: Responding to Social Determinants of Health

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Abstract

Objective To evaluate the impact of a public health approach to pediatric residency education on learner knowledge, skills, attitudes, beliefs, and career choice.

Background Incorporating public health principles into traditional residency education can give pediatricians the population-oriented perspective to address social determinants of health.

Methods The Community Health and Advocacy Training (CHAT) program is an educational intervention with a public health framework. From 2001–2007, 215 categorical pediatric residents and 37 residents in the CHAT program were evaluated by using an annual survey of community pediatrics exposure, knowledge, attitudes, and beliefs. American Board of Pediatrics (ABP) examination passage rates for both groups were also examined, as was career choice after graduation.

Results While interns in both the categorical and CHAT programs scored similarly on attitudes, beliefs, skills,

and knowledge of community pediatrics, the postgraduate level-3 (PL-3) year CHAT residents scored higher in attitudes ($P < .001$) and skills ($P < .05$). Exposure to both didactic ($P < .05$) and practical ($P < .001$) community pediatrics curricular experiences were higher for CHAT residents than for categorical residents. No significant differences between ABP examination scores were found for the 2 groups, although 100% of CHAT graduates passed on the first try compared to 91% of categorical graduates during this time period. A greater percentage of CHAT graduates (82%) than categorical graduates (53%) reported pursuing careers in primary care.

Conclusion With a public health approach to residency education, residents gain the knowledge, attitudes, and skills to address child health problems from a population perspective. Participation in such a curriculum still resulted in high passage rates on the ABP examination.

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Introduction

In the past 2 decades, evidence has emerged demonstrating the importance of multiple determinants of health in childhood, such as the reports by the Institute of Medicine on the importance of early experiences on brain development.^{1,2} In 1999, the American Academy of Pediatrics put forth its first policy statement on “The Pediatrician’s Role in the Community,”³ describing community pediatrics as a synthesis of clinical practice and public health directed toward promoting the health of all children. Education of pediatricians must successfully merge public health and population-based approaches with traditional clinical skill sets.

Current pediatric residency training is lacking in providing approaches and experiences for understanding the broad determinants of children’s health and development.^{4–6}

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In a national survey fielded by the American Academy of Pediatrics in 2007, 21% of pediatric chief residents indicated their program did not provide adequate experiences in working with community-based organizations, and an additional 26% of chief residents rated their programs' experience with community-based organizations as only "minimally adequate."⁷

The current Residency Review Committee (RRC) requirements for pediatrics states, "Residents must be provided structured educational experiences...which prepare them for the role of advocate for the health of children within the community."⁴ While the program requirements indicate community pediatrics and child advocacy experiences are essential, they do not specify a quantity in dedicated weeks, a minimum of necessary experiences, or the content of these experiences during residency training (as they do for inpatient ward or intensive care unit rotations, for example).

Meeting the total health needs of children and families and optimizing the developmental outcomes in children cannot be accomplished without including critical skill- and knowledge-building opportunities in residency programs. Given a lack of specific RRC guidance for the minimum experiences to make a significant educational impact, programs often have responded by implementing short rotation blocks addressing a range of community pediatrics or child advocacy topics.⁸⁻¹² There is a need to examine the learning impact of more intensive and structured educational interventions designed to meet the spirit of the recommendations. Our study reports the effectiveness of an innovative, public health-oriented curriculum over 3 years of training on the knowledge, attitude, and practice of pediatric residents and the impact of such a curriculum on clinical knowledge.

Methods

This was a quasi-experimental study evaluating the knowledge, attitudinal shifts, and skills of pediatric residents. Both were measured through baseline and postimplementation surveys.

Description of the Intervention: The Community Health and Advocacy Training Curriculum

University of California-Los Angeles (UCLA) was awarded a Title VII Health Resources and Services Administration Primary Care Residency Training grant in 2000 and established the Community Health and Advocacy Training (CHAT) program in 2001. The goal was to provide a public health framework for community pediatrics and child advocacy curricular activities for a subset of residents in each year. The CHAT program was set up as a separate match in the National Resident Matching Program, and applicants chose to be in this track when they came to UCLA for pediatric training. The CHAT curriculum consisted of the following 4 major components: (1)

specialized 4-week block rotations in each year of the 3 years of pediatric training, using a public health-oriented approach to content and training; (2) continuity clinic in a federally qualified health center community clinic for 3 years, with faculty preceptors who were trained in pediatrics and public health; (3) longitudinal community/advocacy projects supervised by a public health-trained faculty member; and (4) evening seminars with guest speakers on public health, community, or advocacy topics for 3 years. In addition, the noon conference and Grand Rounds lecture series for all residents were revised to include more public health, community, and advocacy topics. The structure and content of the curriculum were consistently delivered during the time period reported in this study. The CHAT program was recognized with the Academic Pediatric Association's Outstanding Teaching Award in 2005.

Sample

The study sample included 23 residents in the intern class and 21 residents in each of years' 2 and 3 (because of fast-tracking residents into neurology fellowships) from 2001–2004, with these totals increasing to 33 residents in the intern class and 31 residents in each of years' 2 and 3 from 2005–2007, due to a merger with Cedars-Sinai Medical Center's pediatric residency program. There was a range of 2 to 6 CHAT residents per year. An annual survey of community pediatrics knowledge, skills, and attitudes was sent to all residents during the study period at orientations for interns and second-year residents and during the exit interview for third-year residents. This survey had a 71% response rate, with 252 surveys (215 from categorical residents and 37 from CHAT residents) completed of a total possible sample of 355.

Measures

Prior to implementation of the CHAT curriculum in 2001, a survey was constructed to measure the attitudes and beliefs about the importance of general and subspecialty pediatric topics in the primary care of children, exposure to didactic and practical training in these areas, and self-perceived skills in the provision of care in these areas. It was pilot tested for face validity with 10 community pediatric faculty, who offered edits and suggestions prior to finalization.

Residents were asked about their attitudes, beliefs, and self-perceived skills toward 30 topics that included subspecialty topics and general pediatric topics such as preventive counseling for children and teenagers and breastfeeding support for mothers. Behavioral topics included management of behavioral and learning problems in young children and substance abuse and high-risk sexual behavior in adolescents. Topics of family and community violence, identification of community resources for vulnerable populations, and children with special health care needs were also addressed. Finally, attitudes, beliefs,

skills, and exposure to prevention and management of chronic diseases such as obesity and asthma and knowledge of systems of care for children (welfare, foster care, school system) were assessed. Residents estimated their attitudes, beliefs, and self-perceived skills in these 30 topic areas.

We also determined the level of didactic exposure to clinical topics in general pediatrics. Residents were asked to quantify the number of lectures, presentations, or teaching sessions they received, in order to assess exposure. Practical exposure was measured by asking residents to quantify participation in 13 topic areas related to community field activities, such as working with a community partner.

Residents completed a knowledge-based survey to assess community pediatrics resource knowledge, including knowledge of target populations; insurance and public program eligibility requirements; and services offered by community resources, along with knowledge about evidence-based recommendations for common topics such as breastfeeding, obesity, and asthma. The examination consisted of 52 multiple-choice questions, which were individually scored based on the number of correct answers to questions. The level of clinical proficiency was determined using passage rates of the American Board of Pediatrics certifying examination. Postgraduate employment was retrieved from the UCLA pediatric residency alumni database. The study received Institutional Review Board approval at the UCLA.

Analyses

All data analyses were performed using Intercooled version 9 software (StataCorp, College Station, TX). Separate scales were created for resident attitudes, beliefs, and skill levels in the different pediatric topics. Each scale consisted of 30 items, based on the general and subspecialty topics of the survey, with each item scored on a 5-point Likert scale. Each scale score was the sum of the scores of each item. Exposure to community pediatric topics was calculated separately for didactic and practical experiences. The number of didactic lectures attended by residents addressed 28 topic areas. For each topic area, the resident was asked to estimate the number of presentations per topic, and responses ranged from “none” to “over 5.” A scale for didactic exposure was created using the total number of presentations attended and the sum of the responses to each question and ranged from 0 to 140. A scale for practical exposure to community pediatrics topics was calculated from responses to 13 topic areas. Responses ranged from “never” to “always.” The possible range of the sum of the responses was from 0 to 52.

Residents were separated into two groups, interns (Postgraduate Level-1s [PL-21s]) and seniors (PL-2s and PL-3s). The *t* test was used to compare the categorical and CHAT residents' average ratings of their attitudes, beliefs, and skill levels in general pediatric and subspecialty topics, as well as exposure to community pediatric topics. Mean

scores between categorical and CHAT interns and between categorical and CHAT seniors were compared. Data from the interns reflected their baseline knowledge and exposure prior to residency. Responses from the seniors measured the impact of the curriculum.

Knowledge scores were created based on the number of correct answers to each of the 52 multiple-choice questions of the survey. Mean knowledge scores were compared for categorical and CHAT residents using *t* tests. Scores were compared between interns and between senior residents. The pass rate (in percent) for the pediatric board examination was calculated for both tracks. Postresidency practice plans were collapsed into primary care and nonprimary care categories, and the number and percentage of residents planning for careers in primary care in the categorical program and CHAT tracks were calculated.

Results

Of the 252 respondents, gender, ethnic/racial group membership, and pursuit of subspecialty care varied by the categorical and CHAT training groups. Our sample of categorical residents was 38% male, 51% non-Hispanic white, 47% Asian, and 2% Latino. Our sample of CHAT residents was 22% male, 36% non-Hispanic white, 27% Asian, 27% Latino, and 9% African American.

No statistical differences were found between the categorical and CHAT residents in attitudes, beliefs, skills, or knowledge of community pediatrics topics before starting pediatric residency training. Prior to starting residency, the differences in exposure to didactic general and community pediatrics topics were also not significant between the categorical and CHAT residents. During residency, the residents in the CHAT program had statistically significant higher attitudinal and self-perceived skill scores in the 30 topic areas of general pediatric and subspecialty care (137 versus 126, respectively, $P < .001$; 98 versus 91, respectively, $P < .05$). Residents in the CHAT program also reported statistically significant higher exposure to general and community pediatric didactic lectures (62 versus 51, respectively, $P < .05$) and community pediatric practical field experiences (31 versus 25, respectively, $P < .001$) (TABLE 1).

Over time, residents in the categorical program had a statistically significant decrease in attitude scores toward community pediatrics (prior to residency, 134, versus during residency, 126, $P < .0001$), whereas CHAT residents maintained the same level of positive attitude toward community pediatrics (TABLE 2). Residents in both training programs reported statistically significant gains in both self-perceived skill and knowledge scores during residency. Within-group comparisons revealed no differences in exposure to general and community pediatrics didactic lectures before and during residency for both categorical and CHAT residents. Residents of the CHAT training program reported statistically higher exposure to

TABLE 1 DIFFERENCES IN COMMUNITY PEDIATRICS ATTITUDES, BELIEFS, SELF-PERCEIVED SKILLS, AND EDUCATIONAL EXPOSURES BETWEEN CATEGORICAL AND CHAT PROGRAM PARTICIPANTS

Description	Categorical Residents (n = 94)	CHAT Residents (n = 15)	P value
Prior to residency (intern surveys)			
Community pediatrics attitudes	134	139	NS
Community pediatrics beliefs	80	74	NS
Community pediatrics skills	84	84	NS
Community pediatrics knowledge	15	14	NS
During residency (senior surveys)			
Community pediatrics attitudes	126	137	<.001
Community pediatrics beliefs	82	81	NS
Community pediatrics skills	91	98	<.05
Community pediatrics knowledge	19	19	NS
Prior to residency, exposure to			
General and community pediatrics didactic lectures	51	56	NS
Community pediatrics practical field experiences	24	25	NS
During residency, exposure to			
General and community pediatrics didactic lectures	51	62	.02
Community pediatrics practical field experiences	25	31	<.001

Abbreviations: NS, not significant.

community pediatric practical field experiences during residency (prior to residency, 25, versus during residency, 31; $P < .05$). These changes were not observed for residents in the categorical program. More of the CHAT program graduates entered general pediatric careers, including nontraditional careers caring for children in foster care, in the juvenile corrections system, with developmental delays, and in underserved communities. As part of the CHAT curriculum, the CHAT residents were exposed to role models in the community and, thus, were likely more open to consider these careers after graduation. In addition, CHAT faculty encouraged the exploration of these nontraditional careers during residency and supported and encouraged residents' interest in pursuing these career paths.

Passage rates for the American Board of Pediatrics certifying examination were 100% for the graduates of the CHAT program and 91% for the graduates of the categorical program during this time period. The percentage of CHAT graduates pursuing primary care careers was 82%, while the percentage for categorical graduates was 53%.

Discussion

Compared to previous studies of community pediatrics educational interventions, which have reported evaluations of one topic or one discrete block of time,^{10,11,13,14} the quasi-experimental design of the evaluation of the CHAT curriculum allowed for the identification of favorable changes in residents' attitudes toward social, community, and environmental determinants of child health; increased levels of exposure in community and child health advocacy activities; and acquisition of skills to address the prevention and management of many relevant pediatric chronic diseases of the 21st Century. These favorable changes were accomplished by providing longitudinal experiences seamlessly integrated into 3 years of residency training without impacting the acquisition of traditional clinical knowledge.

Residents who participated in the CHAT curriculum maintained more positive attitudes toward community pediatrics, child advocacy, and caring for vulnerable populations than the categorical residents, whose attitudes significantly decreased. These CHAT residents indicated that topics such as child welfare, community violence,

TABLE 2 DIFFERENCES IN COMMUNITY PEDIATRICS ATTITUDES, BELIEFS, SELF-PERCEIVED SKILLS, AND EDUCATIONAL EXPOSURES BEFORE RESIDENCY AND DURING RESIDENCY

Description	Prior to Residency (n)	During Residency (n)	P value
Community pediatrics attitudes			
categorical	134 (94)	126 (116)	<.0001
CHAT	138 (15)	137 (22)	NS
Community pediatrics beliefs			
categorical	79 (94)	82 (115)	NS
CHAT	74 (15)	81 (21)	NS
Community pediatrics skills			
categorical	84 (94)	91 (116)	.001
CHAT	84 (15)	98 (22)	.02
Community pediatrics knowledge			
Categorical	15 (106)	19 (123)	<.001
CHAT	14 (15)	18 (22)	.02
Exposure to general and community pediatrics didactic lectures			
Categorical	50 (94)	51 (119)	NS
CHAT	56 (15)	62 (21)	NS
Exposure to community pediatrics practical field experiences			
Categorical	24 (94)	25 (118)	NS
CHAT	25 (15)	31 (22)	.02

Abbreviations: NS, not significant.

accessing community resources for underserved children and children with special health care needs, and providing preventive health education to various community groups such as schools and child care facilities were important to the primary care of children. These results are critical, considering the increasing prevalence of childhood diseases such as asthma, obesity, and mental health issues and other chronic conditions that are largely shaped by social, community, and environmental factors that create challenges to adequate promotion of health and treatment of disease¹⁵⁻¹⁸ and that require a population-level, public health approach to address successfully. These results also imply that without the frequent reinforcement of these topics throughout residency, pediatric residents' attitudes toward these topics may decrease, especially as the competing clinical priorities occupy more of their time.

As for the knowledge portion of our evaluation survey, categorical and CHAT residents achieved significant increases in community pediatrics knowledge during residency. We expected both groups to do well with the

knowledge questions, because we were aiming for proficiency in basic community pediatrics topics, rather than specialized knowledge about advanced public health topics. The fact that both groups achieved statistically significant increases in community pediatrics knowledge also indicates the spill-over effect the CHAT program had on the categorical curriculum through increased noon conferences and exposure to these topics during community pediatrics intern and child advocacy PL-3 rotations for all residents.

The importance attributed to broad determinants of children's health was mirrored by resident changes in exposure and self-perceived levels of skills to address topics such as community violence and working with community agencies to promote health. Our results suggest that residents who were trained in the CHAT curriculum reported higher levels of exposure and levels of skills to engage in community and child health advocacy experiences to impact and modify the social, community, and environmental determinants of health. While it might be

intuitive that the CHAT residents would by definition have greater exposure to community topics, we wanted to be sure to account for community experiences the categorical residents might have sought on their own. The skills reported by the CHAT residents included specific, demonstrable abilities to improve the health landscape of children and families. For example, residents were able to demonstrate participation in community meetings, contacting schools to advocate for services on their patients' behalf; participation in health-promoting community activities such as leading a parent education curriculum; and providing technical assistance for implementation of developmental screening in a community child care facility. These were services parents and community partners viewed as value-added through the participation of a pediatrician-expert outside of the clinic.

Residents were responsive to the social determinants of health through their increased participation in community and child health advocacy activities. These changes have important implications for graduate behaviors related to patient care, as residents who have changes in self-reported comfort levels in the context of a larger educational intervention are more likely to change their behaviors in patient care¹⁹ and exposure to partnering with communities in improving and advocating for child health are more likely to continue these behaviors once in practice.²⁰ While we found that residents who participated in the CHAT curriculum entered primary care at higher rates than residents who did not participate, our experience has important implications for subspecialty-oriented residents. Because subspecialty clinicians frequently work closely with large numbers of children with special health needs, it is imperative that they are familiar with community resources and strategies.

As part of the CHAT program mission, we were committed to training pediatric residents from diverse backgrounds. We observed that residents from underrepresented minority backgrounds were drawn to the CHAT mission and curriculum and often excelled in their longitudinal projects, exhibiting a passion for and dedication to the public health, population approach to clinical medicine, which differs greatly from the hospital-based, subspecialty-oriented focus of traditional residency training. All CHAT graduates passed their ABP-certifying examination on the first try, despite varying levels of achievement on the United States Medical Licensing Examinations or the In-Training Examinations (data not shown). While participation in the CHAT program likely led to some knowledge acquisition from our didactic curriculum, we believe the CHAT program gave these residents added confidence, and the identification of different clinical strengths during residency allowed them to do better on the certifying examination.

Our study has several implications. First, it is possible to have a positive effect in a critical, evidence-based area of

child health, namely population-level strategies for the approach to determinants of health development. Given this emerging body of evidence, pediatric residency programs should consider inclusion of a public health approach to addressing problems such as obesity, oral health, and special health care needs in children. One of the critical elements for success in this is to have faculty trained in public health or enough faculty development to support junior faculty to pursue this line of curricular development. The UCLA CHAT program was fortunate to have 6 faculty members dually trained in pediatrics and public health at the program's inception. Strategies to support residency programs without public health-trained faculty or a nearby school of public health from which to draw experts should be explored.

Our study has several limitations. First, residents who participated in the public health model of training may have had more interest in these particular topics and training experiences. However, incoming residents (PL-1) in the new CHAT program were not significantly different from those in the categorical program in community pediatrics exposure, attitudes, and beliefs. Second, our evaluation was limited to residents' self-reports, as our study did not have the resources to validate residents' reports of knowledge and skills through observed structured clinical examinations or other observational methods.

Future Directions

A more in-depth exploration of residents' perspectives on participation in the CHAT curriculum through a qualitative study to delineate the curricular components that had the most impact is needed. Other future directions include developing a more substantial curriculum guide in public health that would help other programs implement population-based curricular components.

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