

# Evaluating Resident Screening for Social Determinants of Health: The Development and Assessment of a Structured Direct Observation Tool

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**Abstract:** Background: Physicians must gain competency engaging and screening families from all socioeconomic backgrounds with the growing number of children living in poverty. Traditional medical training lacks sufficient education in screening for social determinants of health. We developed a direct observation tool to evaluate resident screening for social determinants of health, assessed its reliability, and determined if the tool could detect practice change after an educational intervention.

Methods: A quasi-experimental interventional study of pediatric residents in a primary care setting using a direct observation tool during patient encounters was undertaken. Descriptive test statistics of individual question frequency and discrimination as well as overall test reliability were completed. Changes in the total time discussing social history and number of questions asked after an educational intervention were analyzed.

Results: Increase in mean number of questions from 6.6 pre intervention to 8.5 post- intervention ( $p=.04$ ). Residents spent a statistically significant greater amount of time (97 to 184 seconds,  $p=.01$ ) discussing the social history with patients after education. Point biserial calculations for all items in the tool were positive.

Conclusions: This direct observation tool was reliable and detected practice changes in this innovative pilot study. This structured tool may improve compliance with direct observation requirements and help provide residents with objective feedback.

**Keywords:** Direct observational tool, Well child care, Pediatrics, Social determinants of health, Continuity clinic.

## INTRODUCTION

In addition to access to routine healthcare, medications, healthy food and physical activity, children require adequate social resources and a safe, supportive environment in which to grow and develop. Poverty and social stressors have been shown to be an emerging morbidity for children; a childhood spent in poverty can have negative effects on future health status [1]. Higher rates of communicable diseases, such as otitis media and diarrhea, and exacerbations of chronic diseases, such as asthma, have been linked to substandard housing conditions and homelessness. These same home environments have been linked to decreased healthcare utilization for children [2, 3]. Moreover, conditions commonly associated with poverty, including food insecurity, housing instability, and parental substance abuse, are associated with a higher prevalence of developmental, behavioral, and learning problems in children [4].

Given the growing number of children that live in poverty and encounter social and environmental risk factors, physicians must gain comfort and competency engaging families

from a variety of socioeconomic backgrounds and screening for risk factors that may affect a child's health and well-being [5]. During their training, resident physicians regularly encounter families with varying socioeconomic backgrounds that face a number of social and environmental stressors [6]. Resident continuity clinics often provide care to patients impacted by a range of social determinants of health (SDH), yet traditional medical training lacks sufficient education on these SDH [7]. The Accreditation Council on Graduate Medical Education (ACGME) requires that pediatric residents receive training on child advocacy including SDH [8]. Previous studies have demonstrated that resident advocacy training leads to acquisition of skills and improved competency in community health issues, including identifying community resources and counseling patients [9, 10]. However, only 16% of practicing physicians think there is enough time to address family psychosocial issues during well child care, highlighting the importance of training residents to be comfortable asking about these issues in an efficient manner [11].

The ACGME requires that faculty assess and provide written feedback regarding a resident's patient care and communication skills by direct observation in real and simulated situations [8]. Although there have been observation tools developed for observation in the outpatient clinic setting, there currently is no validated direct observation tool in the literature

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that provides faculty with a structured method for observing and providing feedback to residents about their screening and counseling practices related to the SDH [12]. This lack of standardization leaves faculty to depend on their own skills and comfort levels guiding residents during the screening for these critical social issues. Further, most observational tools used in education measure actions but only a limited number have been studied for their ability to detect change in actions after an educational intervention [13]. In a survey of our residents, greater than 90% reported that it is appropriate for a physician to ask about a variety of SDH during routine care, yet there is little published information on resident physicians' actual practice [14].

The purposes of this study were to 1) develop a direct observation tool for evaluation of residents' ability to obtain a comprehensive social history and 2) determine if the tool can detect a change in resident practice after an educational intervention. We hypothesized that the direct observation tool would detect a change in their social history taking practice following education directed at skills required for social history taking.

## MATERIALS & METHODS

This was a quasi-experimental study conducted from October 2010 to February 2011 in a large, urban academic pediatric residency training program. It was approved by the Institutional Review Board of the Cincinnati Children's Hospital Medical Center (CCHMC).

### Study Setting

The study was performed at three sites in CCHMC, which has a large pediatric residency training program with over 180 residents. Clinic A is a large, urban, academic pediatric primary care clinic that serves as the continuity site for 75 pediatric residents, 35,000 visits per year, and on-site social work and legal aid. Clinic B is an offsite community health center that has 19 continuity clinic residents, approximately 10,000 visits annually, and on-site social work and access to legal aid. Clinic C is a large, urban, academic medicine-pediatric combined clinic that serves as continuity site for 28 residents, 12,000 adult and pediatric visits per year and part time social work without access to legal aid. All three sites provide care to predominantly economically disadvantaged patients with a payer mix consisting of 70-80% Medicaid/Medicare, 10-20% self-pay and 10% insured. All clinics care for a diverse patient population with approximately 70% African American, 20% Caucasian, 1% Hispanic, 1% Asian, 0.1% American Indian, 3% multi-racial, and 4% other across all three sites. The learning environment is similar at all three teaching sites. All preceptors have appointments at the same institution with similar faculty development opportunities. In summary, the sites do not differ significantly in ways that may influence learner performance or faculty observations.

### Study Subjects

All 2<sup>nd</sup> year Categorical Pediatric residents who have their continuity clinic at Clinic A (25) or Clinic B (7) and all 2<sup>nd</sup> and 3<sup>rd</sup> year combined Medicine-Pediatrics resident who

have their continuity clinic at Clinic C (11) were invited to participate in the study. Convenience samples of residents at each of the three sites were selected for direct observation during a Well Child Check (WCC) visit.

### Direct Observation Tool Development

The resident observation social history tool was developed de novo for this study by experts from the General Pediatrics Education Section, an educational psychologist, and members of the Medical Legal Partnership. The questions were selected after completing a review of the literature for expert national opinion and validated measures. The tool includes previously validated measures for maternal depression [15, 16] and food insecurity [17], as well as topics included in national consensus opinions for SDH screening [18-20]. The observation tool was reviewed and revised by the Medical Education Research Group and the Division of Education and Learning. The tool was piloted for content and clarity by a group of Chief Residents. The observation tool utilized a dichotomous (yes-no) checklist format for each question (Table 1). Length of time, in seconds, that residents spent obtaining a social history was recorded by the observing faculty.

### Educational Interventions

Study personnel developed case-based simulated video scenarios to role model appropriate and inappropriate techniques of engaging families while addressing the social issues related to poverty. Additionally, multi-disciplinary interactive presentations were facilitated during a standard educational conference for all residents. All residents completed the same educational interventions. Educational materials were developed by medical educators and interdisciplinary content experts and reviewed by the Medical Education Research Group, Pediatric Chief Residents, social workers and pediatricians specializing in care of underserved populations. The educational interventions focused on family stressors and health effects related to food insecurity, housing conditions, utility issues, domestic violence and access to public benefits, such as the supplemental nutrition assistance program (SNAP) and cash assistance.

### Data Sources, Measures, and Collection Procedures

Five faculty members from the research team conducted standardized direct observations of a convenience sample of resident WCC visits from each clinic site (10 of 25 at Clinic A, 3 of 7 at Clinic B, 6 of 11 at Clinic C) using the structured observation checklist before and after an educational intervention. Faculty at each site were trained to use the same observation tool in the same manner. All residents eligible to participate agreed to take part in the study. Prior to the direct observations, research faculty members participated in a 2 hour instructional session to understand how to score the checklist to limit inter-observer variability; faculty watched simulation videos of residents obtaining social histories from trained patients, then scored the encounters and discussed the scoring as a group to reach consensus. Results from the real-time patient visit observations were collected on paper and then entered into a secure computer drive for further analysis.

**Table 1. Summary Test Statistics for Observation Tool**

	Pre-Education (N=19)	Post-Education (N=19)
<b>Test statistics</b>		
Examinees:	19	19
Items:	20	20
Mean:	6.60	8.50
SD:	3.54	3.43
Variance:	12.51	11.73
Min:	0	1
Max:	12	13
KR-20:	0.80	0.79
SEM:	1.58	1.59
<b>Item statistics</b>		
Mean P:	0.31	0.39
Min P:	0.00	0.00
Max P:	0.84	0.95
Mean rpBis:	0.47	0.45
Min rpBis:	0.12	0.09
Max rpBis:	0.85	0.80

### Data Analysis

Observations at all 3 clinic settings were combined given the similarity of the learning environments, the standard training of observing faculty and use of the observation tool. Differences in the overall mean number of questions asked and time spent obtaining a social history were analyzed via the Wilcoxon Signed Rank test. Statistical analysis was completed using CITAS (Thompson, 2009) for each of the 20 checklist items included in the tool. The discrimination for each item was measured using point biserial correlation (rpBis). Given that this observation instrument was set up as a survey, the interpretation of discrimination values differs from a traditional knowledge based test. Questions that have higher point biserial correlations do not indicate questions that were answered correctly by those who “scored higher” (there were no correct or incorrect answers), rather a higher result indicates that the questions are more commonly asked along with others from the screening tool [21]. In general for this type of tool, a positive rather than negative point-biserial speaks to the quality of the measurement instrument with a goal of a point-biserial above 0.3. In addition, the percentage of the total encounters during which each question was asked was determined. Descriptive statistics were performed to determine mean, standard deviation, Kuder Richardson formula 20 (KR-20), and standard error of measurement (SEM). KR-20 is used to measure consistency or reliability for questions with dichotomous choices; the closer to 1 the value, the more consistent the questions [21].

### RESULTS

At an individual skill level, there were some questions on the checklist that were infrequently completed and others that were almost universally completed. There was a significant increase in frequency of asking specific questions after the educational intervention. Point biserial calculations resulted in a positive value for all recorded questions. There were three questions never asked; therefore we did not calculate a point biserial for these items.

Overall test statistics revealed an improvement in mean questions asked from 6.6 (SD 3.8) pre-education to 8.5 (SD 3.8) post-educational intervention ( $p=.04$ ). The mean represents the recorded number of questions posed during a patient interview. The KR-20 reliability coefficient was 0.8 for both the pre and post-educational uses of the observational tool.

Item statistics revealed that questions regarding Supplemental Security Income (SSI), immigration and use of generic formula were not asked by any resident during either observation. Questions regarding home structure and general concerns for housing, food or benefits were asked by >85% of the post-education group. The frequency of 12 of the 20 questions asked increased post education and 3 of the 20 questions were not asked at either time. The largest increased frequency of questions asked related to general family stressors and support, cash assistance, domestic violence, SNAP, food insecurity, housing conditions, and utilities. All of these topics were discussed in educational interventions.

Following the educational intervention residents were observed to spend a greater amount of time discussing the social history with patients, with a mean change from 97 to 184 seconds ( $p=.01$ ).

Discrimination, as measured by rpBis, was similar during pre-education use (0.12 to 0.85) and post-education use (0.09 to 0.80). The most discriminating questions pre-education

were related to the topics of food insecurity/hunger and WIC while post-education were related to food insecurity/hunger and general food or benefits issues, and specific housing issues, topics emphasized during the education. Additionally, discrimination for items regarding cash assistance, family stress, and food stamps improved for the post-education observations (Table 2).

**Table 2. Individual Observation Tool Question Statistics**

Question	Pre-intervention frequency of being asked	Post-intervention frequency of being asked	Percentage change in frequency of being asked	Pre-intervention rpBis	Post-intervention rpBis
1. Maternal depression (hopeless)	0.21	0.21	0%	0.49	0.42
2. Maternal depression (no interest)	0.11	0.05	6%	0.38	0.09
3. Domestic violence (safe in relationship)	0.16	0.26	10%	0.56	0.43
4. Home make-up (child lives with)	0.84	0.95	11%	0.53	0.41
5. Asked family stressors (school, work, illness, family issues)	0.32	0.53	21%	0.35	0.51
6. Asked about strengths & support (family, church, friends)	0.37	0.58	21%	0.40	0.23
7. Asked about strengths & support (family, church, friends)	0.74	0.79	5%	0.28	0.32
8. Addressed daycare vouchers	0.11	0.05	-6%	0.38	0.09
9. Asked, general concerns for housing, food or benefits (making ends meet?)	0.63	0.84	21%	0.68	0.80
10. Addressed food stamps	0.32	0.53	21%	0.42	0.54
11. Addressed cash assistance (welfare)	0.05	0.21	16%	0.12	0.54
12. Addressed medical insurance	0.21	0.11	-10%	0.19	0.23
13. SSI claim denied	0.00	0.00	n/a	n/a	n/a
14. Asked, food insecurity or hunger	0.53	0.68	15%	0.85	0.67
15. Addressed receiving WIC	0.68	0.63	-5%	0.73	0.48
16. Generic formula addressed/discussed	0.00	0.00	n/a	n/a	n/a
17. Asked safe housing conditions (disrepair, mold)	0.32	0.58	26%	0.58	0.62
18. Asked about utility issues	0.16	0.42	26%	0.56	0.66
19. Asked stable housing (eviction, foreclosure)	0.47	0.37	-10%	0.52	0.67
20. Asked about immigration status	0.00	0.00	n/a	n/a	n/a

## DISCUSSION

Social determinants of health, such as food security, acquisition of appropriate public benefits, safe and stable housing, domestic violence, and support for the child and parents, are critical to ensuring a child's health. As many pediatric residents care for underserved children in their continuity clinics during their training, ensuring residents have the educational training and skills, as well as appropriate feedback about their application of these skills, is critical. Developing validated tools to assist faculty in a standardized and structured way to observe and provide residents with feedback is essential. This new social history observation tool was reliable both pre- and post-intervention (KR20 0.8 for each). As this study describes a brief observation (20 items) of history taking during continuity clinic on a small sample of residents, this reflects an acceptable level of internal consistency reliability.

Residents asked, on average, 1.9 more questions after training and spent 87 seconds longer on these questions, both of which were detected through the use of the observation tool. Residents were not given feedback after their first observation to limit potential behavior change during the second observation. A larger increase in frequency of questions asked was seen for those correlating to topics covered in the educational intervention. This observational tool was able to detect an increase in the overall number of questions asked and, specifically, those questions related to the content of the educational sessions. This provides support that the tool is measuring the topics as intended, as one would expect to see more residents ask questions related to a recent educational intervention. On the contrary, there were a few topics for which the frequency of questioning remained the same or decreased post-intervention, questions not related to the content of the educational sessions, suggesting that without the educational intervention, the one-time use of the observation tool itself was not effective at changing resident practice patterns. It is possible that repeated use of the tool may translate to a change in practice that was not detected with a single use.

While all 20 questions in our original tool are important components of a social history, item analysis can be used to determine how each item adds to the observation tool. Analysis of item discrimination is key to this evaluation and it is typically accepted that discrimination above 0.3 is useful for lower-stakes evaluations [16]. For our tool, 13 questions had discrimination above 0.3 and the mean discrimination was 0.45. Additionally, the discrimination improved for the topics covered in the educational interventions demonstrating the tool's ability to detect improved discrimination in addition to improved frequency of questioning.

Furthermore, the even higher discrimination questions are useful as they indicate that these questions are asked by residents who ask more questions overall. This information could aid in developing a shorter observation tool; if only those questions with highest discrimination are included one could infer that residents asking more of these questions asked more questions in general. For example, if our tool is narrowed to only the eight questions with discrimination above 0.50 the mean discrimination score of the tool improves to 0.63. This does come at a cost, however, if there is

a question that is rarely asked but that the faculty view as critical, it is important to continue to include in the observation tool.

In order to simplify the tool, less critical items that were infrequently or never asked could be eliminated. Elimination of questions from the observation tools is dependent upon both expert recommendation and local risk factors and social issues (e.g. immigration, poverty rates, presence of food insecurity, etc.).

The use of this observational tool both before and after an educational intervention demonstrates the utility of such a tool in monitoring and assessing educational interventions. Not only can this tool be used to aid faculty in providing useful and targeted feedback after direct observation, it can also be used to assess improvement in residents' skills over time. An important next step for this tool would be to monitor the frequency of resident counseling about the SDH and referrals to community agencies over time to determine if education and direct observation with structured feedback positively impacts patient care.

There are limitations to this study. First, this tool was studied with limited numbers of residents in 3 clinics with the majority of patients being medically underserved which may limit generalizability. However, each clinic had access to different resources such as social work and legal aid. In order to ensure generalizability across sites, studying this tool in other clinical sites (inpatient, ED) and with other medical learners (medical students, interns) would be beneficial. Further study could help determine which questions are most appropriate at different levels of training and which are most amenable to educational interventions. Second, while questions were selected from previously validated questions and national consensus opinion, when possible, the remaining questions were developed *de novo* to reflect the most prevalent social determinants in our community. Third, the faculty observers contributed to the development of the observation tool as they were part of the local expert group in the areas of SDH, which may have introduced bias during their observations.

## CONCLUSION

Comprehensive physician assessment of SDH is a key component to addressing health disparities and improving overall child health. Residency programs are required to provide educational experiences that fulfill ACGME competencies and to document direct observation of these skills, including the ability to assess, counsel and advocate on behalf of patients. The tool developed and evaluated in this pilot study could standardize SDH observations, provide objective information for feedback, and potentially enhance compliance with the ACGME advocacy training requirements.

## ABBREVIATIONS

WCC	=	Well child care
SDH	=	Social Determinants of Health
ACGME	=	Accreditation Council for Graduate Medical Education

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None.

**CONFLICT OF INTEREST**

The authors have no conflict of interest related to this project and have no corporate sponsors.

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