Screening for Social Determinants of Health in Pediatric Resident Continuity Clinic

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ABSTRACT

OBJECTIVE: Describe current practices in systematic screening for social determinants of health (SDH) in pediatric resident clinics enrolled in the Continuity Research Network (CORNET).

METHODS: CORNET clinic directors were surveyed on demographics, barriers to screening, and screening practices for 15 SDH, including the screen source, timing of screening, process of administering the screen, and personnel involved in screening. Incidence rate ratios were tabulated to investigate relationships among screening practices and clinic staff composition.

RESULTS: Clinic response rate was 41% (65/158). Clinics reported screening for between 0 and 15 SDH (median, 7). Maternal depression (86%), child educational problems (84%), and food insecurity (71%) were the items most commonly screened. Immigration status (17%), parental health literacy (19%), and parental incarceration (21%) were least commonly screened. Within 3 years, clinics plan to screen for 25% of SDH not currently being screened. Barriers to screening included lack of time (63%), resources (50%), and training (46%).

CONCLUSIONS: Screening for SDH in our study population of CORNET clinics is common but has not been universally implemented. Screening practices are variable and reflect the complex nature of screening, including the heterogeneity of the patient populations, the clinic staff composition, and the SDH encountered.

KEYWORDS: CORNET; resident continuity clinic; screening; social determinants of health

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WHAT'S NEW

Among participating Continuity Research Network continuity clinics, screening for social determinants of health (SDH) is common but has not been universally implemented. Maternal depression, child educational problems, and food insecurity are most frequently screened. Lack of time and resources to address identified SDH are the most commonly cited barriers to screening.

SOCIAL DETERMINANTS OF health (SDH) are the economic, environmental, and family contextual factors that integrate with biology, genetics, and behavior to produce health outcomes. Adverse social determinants are root causes of poor health in childhood and across the life span.[1,2] SDH may worsen outcomes directly, such as when mold exposure or passive smoke exacerbates asthma.[3] Less directly, early adversity from exposure to violence, food insecurity, housing instability, or family dysfunction works through the common pathway of toxic stress to compromise physical health, socioemotional development, and educational achievement.[4,5] Toxic stress disrupts neuroendocrine, inflammatory, and immune system functions, leading to illnesses including depression, suicide, substance abuse, obesity, cardiac disease, inflammatory diseases, and cancer.[6] Children living in poverty are particularly vulnerable to poor health outcomes.[1] Twenty percent of US children live in poverty.[7] Each of these children is 5 times as likely to be maltreated as those with financial stability.[8]

For these reasons, pediatricians are increasingly motivated to work outside of the traditional biomedical model to address SDH in practice.[8–10] In 2013, the American Academy of Pediatrics and the Academic Pediatric Association (APA) created task forces on child poverty.[11,12] As a result, the American Academy of Pediatrics published a 2016 policy statement describing the effects of poverty on children and calling on health providers to assess the

financial stability of families, link families to resources, and coordinate care with community partners.[12] An APA work group published a 2016 guideline for clinicians highlighting the importance of addressing SDH and outlining screening tools and resources to do so.[9] The fourth edition of Bright Futures Guidelines for Health Supervision of Infants, Children, and Adolescents includes SDH as a new category of anticipatory guidance.[13]

Amidst the growing consensus that medical homes have the potential to help mitigate the effects of SDH, little is known about current screening practices. This study examines current practices on screening for 15 SDH in pediatric resident continuity clinics. As academic institutions are often early adopters of new recommendations and evidence-based changes to care, examining uptake of screening in the continuity clinic is integral to broadening implementation into other health care settings. Furthermore, residents will likely bring skills learned during their continuity experience to the workforce, potentially foreshadowing future national SDH screening practices. We hypothesize that we will detect screening for some of the 15 SDH included in our study, but that all clinics will not report screening all patients for all 15 SDH.

METHODS

OVERVIEW

This is a cross-sectional, observational study of pediatric resident continuity clinic directors whose institutions are members of the APA's Continuity Research Network (CORNET). Fifty-three percent of pediatric residency training programs nationwide are represented in CORNET. CORNET encompasses over 6200 trainees serving more than 1 million pediatric patients. A study comparing CORNET practices to a national probability sample of community pediatric practices found that CORNET practices were more racially and ethnically diverse and served more publicly insured patients.[14] Given the elevated burden of poverty in the CORNET network, screening for SDH is particularly salient. The study protocol was reviewed by the Institutional Review Board of the Office of Human Research Ethics of the University of North Carolina (UNC) and was determined to be exempt from human subjects research. Data were collected and managed using REDCap (Research Electronic Data Capture), a secure, web-based application designed to support data capture for research studies.

PARTICIPANTS, ENROLLMENT, AND PROCEDURES

Study enrollment took place from March to December 2017. Resident clinics at CORNET residency programs were invited to participate via e-mail. Each of the 158 individual clinic sites of the 112 CORNET programs was eligible. The designated pediatric faculty person serving as the CORNET contact for each institution received an invitation to participate in the study posted to the CORNET listserv. Throughout the study period, 6 recruitment e-mails were posted to the listserv, and CORNET regional research chairs e-mailed their region institutions once to encourage participation. Interested institutions contacted the CORNET research coordinator and provided contact information for each continuity clinic site director. The CORNET research coordinator released collated contact information to the research team on a weekly basis. A REDCap survey link was e-mailed to the continuity clinic director for each site that agreed to participate. The surveys were confidential, and each survey link was unique to the clinic site. Three weekly automated reminders and at least 2 personal e-mails followed until the survey was completed or until data collection closed. Participants received a $25 gift card for survey submission.

SURVEY

The survey was designed and piloted with 5 resident continuity clinic sites in consultation with the UNC REDCap bioinformatics team and the UNC Odum Institute for Social Science Research. Pilot feedback was incorporated prior to initiating data collection. The survey requested data from July 1, 2015, to June 30, 2016. The following information was collected: residency program characteristics (number of residents in program, number of residency clinic sites in program), clinic characteristics (whether or not residents who were enrolled in a primary care track provided clinical care at site, annual number of patients served, annual number of patient encounters, region of country in which the clinic was located, and staff composition, including the presence of social workers, care managers, domestic violence counselors, community health workers, and medical legal partnerships), and patient characteristics (percentage of clinic patients insured by Medicaid and percentage of Hispanic, black, and white patients).

Next, we collected data on SDH domains. There is no consensus on which SDH to address, perhaps, in part, because screening should be population dependent and is therefore influenced by both the needs of the patient population and the local resources available to address those needs. We included 15 social determinants, most identified from 2016 guidelines published by Chung and colleagues,[9] including child maltreatment, family financial support, intimate partner violence, maternal depression or family mental illness, household substance abuse, parental health literacy, childcare needs, child education, physical environment (home and neighborhood), food insecurity, and firearm exposure. In addition, we asked about parental incarceration[15] and parent stress,[16] which have been included in other SDH single-center studies. In 2016, 25% of children in the United States were foreign born or resided with at least 1 foreign-born parent,[17] so we asked about immigration screening, hypothesizing that some clinics may have systems in place to identify and address the unique health needs of this underserved population.

Specifically, we asked whether the clinic conducted systematic screening (defined as asking prescribed questions in a methodical way such as through a screening tool or questions embedded in the medical record) for each of the 15 SDH. If screening was in place, we requested logistical

details for each SDH being screened, including whether the tool was an unaltered previously validated measure, a previously validated measure adapted for use in the clinic, or an internally developed measure. We also asked about the types of visits where screening took place, the method of screening (face-to-face, paper, electronic), who administered the screen, and who followed up the results of the screen. If screening was not occurring, we asked about plans to implement screening within 3 years and about perceived barriers. The complete survey instrument is available from the author.

Statistical Analysis

Residency program characteristic were compared between CORNET programs that participated in the study, CORNET programs that did not participate in the study, and programs not enrolled in the CORNET network. Clinic characteristics were compared between CORNET participating and non-participating sites using chi-square tests for categorical variables and ANOVA *F*-tests for numerical variables. Proportions were calculated for categorical survey data. Means and ranges were calculated for continuous survey data. To investigate associations between the screening practices and clinic staff composition, we estimated unadjusted odds ratios (ORs) and incidence rate ratios (IRRs). For each of the 15 SDH, 4 logistic regression models were used to estimate the unadjusted ORs. For the total number of SDH screened, 4 Poisson regression models were used to estimate the unadjusted IRRs. To account for correlation among clinics from the same residency program, all models were fitted using generalized estimating equation methods; an exchangeable working correlation structure was assumed, and empirical standard errors were used to obtain the confidence intervals (CIs). The resulting OR and IRR estimates were used to suggest or refine hypotheses about putative associations. Thus, adjustment for multiple testing was not undertaken. The statistical computations were performed using SAS/STAT 9.4 (SAS Institute; Cary, NC.)

Results

Sixty-five of the 158 CORNET clinic sites (41%) from 50 of 112 CORNET residency programs (45%) completed the survey. Participating residency programs tended to have more residents compared to non-participating programs ($P < .001$), and participating CORNET clinics tended to have fewer white patients compared to non-participating CORNET clinics ($P = .003$) (Table 1). Most patients were insured through Medicaid (72%). The majority of clinics employed a social worker on their staff (83%). The mean number of SDH being screened for was 7. The range of screened SDH was 0 to 15, with two clinics reporting no screening and 2 clinics screening for all 15 SDH.

Clinics used validated screening instruments (31%), instruments developed by the staff (28%), or adaptations of validated instruments (16%) (Table 2). Most surveys were administered via paper forms (55%). Screening most commonly occurred at all well visits (47%) or at age-specific well visits (32%). The primary care provider most commonly administered the screening (51%). Screening was most likely to occur during the provider encounter or when the patient was first placed in a room. Social workers, followed in frequency by primary care providers, were most likely to follow up on positive screens (Table 2).

The most commonly cited barriers to screening were lack of time (68%), lack of resources to address positive screens (50%), and inadequate training to administer and address positive screens (47%). Five percent of respondents said screening was not indicated in their patient population, and 9% cited inadequate evidence as a barrier to screening.

In the exploratory analysis, clinics with a medical legal partnership were more likely to report screening for immigration (OR 6.52 [1.75, 24.27]), parental incarceration (OR 4.19 [1.20, 14.58]), and health literacy trending toward significance (OR 3.23 [0.84, 12.37]). Clinics with a community health worker had three times the odds of screening for childcare needs (OR 3.16 [1.12, 8.93]) (Table 3).

Discussion

Although 97% of the pediatric resident continuity clinics enrolled in this study reported screening for at least 1 SDH, few clinics reported screening for the majority of SDH included in our survey. Four SDH are being screened for in 60% or more of clinics: maternal depression or family mental illness, educational problems, food insecurity, and firearm exposure (Table 4). These have several shared characteristics, including validated, concise screening tools; longstanding *Bright Futures* recommendations; literature suggesting benefit; and identifiable interventions. We suspect that such factors may contribute to higher screening rates, although this was not queried in our study.

Maternal depression screening, a *Bright Futures* recommendation since 2008, is the most frequently screened SDH (86%).[18] Brief, validated cost-free screening tools such as the Edinburgh Postnatal Depression Scale and the Public Health Questionnaire 2 exist, making depression screening easy and efficient to implement.[9] Postpartum depression affects 10% to 15% of women, and successful referral and treatment are possible in pediatric primary care settings.[19] Poor health and educational outcomes have been documented for children of mothers with untreated depression.[9,20] Although mothers may only access health care for themselves at a single postpartum visit, they routinely present with their infants for multiple pediatric encounters from birth to 6 months, giving pediatricians a unique opportunity to screen. Successful referral and treatment are possible in primary care settings.[21]

Educational screening is the second most common screened SDH. Under the Individuals with Disabilities Education Act, children identified as having developmental delay or risk of autism should be referred to their state's early intervention program for further evaluation and intervention. Those who do not meet criteria for early intervention programs but have identified SDH that may

Table 1. Demographic Characteristics

Characteristic	CORNET Participants (N = 50)	CORNET Non-Participants (N = 62)	Non-CORNET Non-Participants (N = 100)	*P* Value
Residency Program Characteristics				
Number of residents in program, mean (range)	63 (18–159)	48 (18–121)	36 (12–156)	<.001
Number of clinic sites in program, mean (range)	6 (1–39)	NA	NA	—
Primary care track, % (n)				.28
Yes	34% (17)	39% (24)	44% (44)	
No	46% (23)	42% (26)	37% (37)	
Missing	20% (10)	19% (12)	19% (19)	
Region of country, % (n)				.25
Northeast	26% (13)	24% (15)	34% (34)	
Midwest	18% (9)	23% (14)	23% (23)	
South	38% (19)	34% (21)	32% (32)	
West	18 % (9)	19% (12)	11% (11)	
Clinic Characteristics				
Characteristic	CORNET Participants (N = 65)	CORNET Non-Participants (N = 93)	Non-CORNET Non-Participants	*P* Value
Additional staff, % (n)		NA	NA	—
Social worker	83% (54)			
Social work surrogate	63% (41)			
Domestic violence counselor	22% (14)			
Community health worker	35% (23)			
Medical legal partnership	31% (20)			
Annual number of patients served, mean (range)	9477 (1000–39,439)	NA	NA	—
Annual number of encounters, mean (range)	18,727 (2700–80,000)	NA	NA	—
Patient Characteristics				
Characteristic	CORNET Participants % (n)	CORNET Non-Participants % (n)	Non-CORNET Non-Participants % (n)	*P* Value
Patient Characteristics				
Patients publicly insured, %			NA	.15
0–25	5% (3)	8% (7)		
26–50	8% (5)	15% (14)		
51–75	14% (9)	22% (20)		
76–100	65% (42)	48% (45)		
Missing	9% (6)	8% (7)		
Hispanic patients, %			NA	.18
0–25	48% (31)	52% (48)		
26–50	26% (17)	19% (18)		
51–75	14% (9)	11% (10)		
76–100	3% (2)	12% (11)		
Missing	9% (6)	6% (6)		
Black patients, %			NA	.22
0–25	39% (25)	57% (53)		
26–50	22% (14)	20% (19)		
51–75	19% (12)	14% (13)		
76–100	9% (6)	4% (4)		
Missing	12% (8)	4% (4)		
White patients, %			NA	.003
0–25	51% (33)	33% (31)		
26–50	28% (18)	19% (18)		
51–75	8% (5)	25% (23)		
76–100	2% (1)	12% (11)		
Missing	12% (8)	11% (10)		

NA indicates not available.

impair development can be referred to Early Head Start or Head Start. Primary care interventions have been demonstrated to increase enrollment in Head Start,[9,22] and enrollment in early childhood education programs improves educational, socioeconomic, and health outcomes.[9,20,22–25] But, when children reach school age, they no longer receive developmental screens. Educational screening for school failure identifies older children

Table 2. Characteristics of Social Determinants of Health Screening

Characteristic	Percent (%)
Screening tool source	
Validated	31
Original	28
Adapted	16
Unsure	25
Visit type	
All well visits	47
Specific well visits	32
Provider-led visits	20
All visits	10
Method of screening	
Paper	54
Person	36
Electronic	6
Other	4
Time of screening	
Encounter	44
Rooming	36
Waiting room	21
Pre-visit	1
Staff administering screen	
Provider	51
Nurse/medical assistant	39
Preclinical	25
Social worker	6
Staff following up screen	
Social worker	88
Behavioral health specialists	42
Provider	12
Nurse	1

with conditions such as learning disabilities, attention-deficit/hyperactivity disorder, or SDH that lead to school failure. Pediatricians can facilitate referral of school-aged children for the evaluation and services to which they are entitled by law, thereby potentially leading to optimal school performance.[9]

Food insecurity is the third most common screened SDH, possibly due to the availability of a validated 2-question screen[26] and concrete interventions to address positive screens. Food-insecure families can be referred to the Special Supplemental Nutrition Program for Women, Infants, and Children, as well as community food pantries.[9] The relationship of food insecurity to a traditional biomedical parameter, growth, joined with a simple screen and a growing body of literature on childhood obesity, makes it a natural and comfortable area for pediatric inquiry.

Firearm exposure is the fourth most common screened domain. Although there is not a validated screening tool, questions for screening are part of *Bright Futures* guidelines.[18] Firearms contribute to homicide, suicide, and unintentional injury, the top 3 causes of morbidity and mortality in the pediatric population,[27] which disproportionately affect African American teen males.[28] The possibility of mitigating preventable and disparate pediatric injury and death may motivate pediatricians to screen.

Barriers to SDH screening previously noted in the literature have included lack of recognized benefit or measurable outcome of screening, lack of time, lack of professional training to administer and address positive screens, lack of familiarity with relevant tools, and lack of knowledge of community resources.[9,29] Our study of clinics serving populations with higher burdens of poverty and therefore higher likelihood of SDH suggests that providers accept the evidence and indication for screening. They hesitate primarily because of time constraints, indicating the need for streamlined screening methods, improved workflow, and additional integration of interdisciplinary teams into the clinic so the patients' medical and social problems can be fully addressed. Even with 88% of

Table 3. Incidence Rate Ratios and Odd Ratios Between Social Determinant of Health Screening and Multidisciplinary Clinic Staff

	IRR/OR* (95% CI)			
	Social Worker	Care Manager	Community Health Worker	Medical Legal Partnership
Total number of SDH screened	1.2 (0.90–1.58)	0.98 (0.72–1.32)	1.21 (0.98–1.51)	1.2 (0.92–1.55)
Child maltreatment	0.72 (0.22–2.31)	1.17 (0.37–3.74)	1 (0.39–2.57)	1.25 (0.44–3.59)
Financial support	2.92 (0.91–9.34)	1.1 (0.65–1.87)	4.14 (0.85–20.13)	1.46 (0.88–2.42)
Intimate partner violence	2.58 (0.71–9.33)	0.48 (0.15–1.56)	0.85 (0.30–2.43)	1.06 (0.42–2.63)
Mental health	2.99 (0.78–11.53)	0.17 (0.02–1.71)	1.14 (0.28–4.60)	0.86 (0.14–5.37)
Substance abuse	1.73 (0.39–7.63)	1.45 (0.55–3.82)	1 (0.41–2.40)	0.65 (0.22–1.88)
Parental health literacy	0.52 (0.15–1.84)	1.09 (0.29–4.07)	0.70 (0.20–2.47)	3.23 (0.84–12.37)
Parental stress	2.86 (0.72–11.41)	0.95 (0.27–3.37)	1.39 (0.47–4.08)	0.89 (0.27–2.95)
Child care needs	1.84 (0.47–7.24)	0.69 (0.24–1.97)	3.16 (1.12–8.93)	1.37 (0.43–4.36)
Child school problems	1.43 (0.41–4.95)	1.25 (0.38–4.14)	1.08 (0.29–4.07)	0.71 (0.19–2.72)
Home environment	1.61 (0.32–7.95)	0.58 (0.21–1.57)	2.54 (0.98–6.54)	1.87 (0.63–5.57)
Neighborhood environment	1.18 (0.39–3.60)	3.15 (1.05–9.49)	2.54 (1.00–6.49)	1.27 (0.47–3.46)
Food insecurity	0.78 (0.27–2.24)	0.62 (0.17–2.27)	1.58 (0.59–4.24)	1.81 (0.32–10.15)
Parental incarceration	1.66 (0.48–5.77)	0.88 (0.23–3.32)	0.78 (0.24–2.52)	4.19 (1.20–14.58)
Immigration status	2.64 (0.28–25.00)	0.77 (0.20–2.88)	2.09 (0.59–7.47)	6.52 (1.75–24.27)
Firearm exposure	0.75 (0.23–2.45)	1.50 (0.53–4.29)	1.31 (0.47–3.63)	0.84 (0.27–2.57)

CI indicates confidence interval; IRR, incidence rate ratio; OR, odd ratio; SDH, social determinants of health.

Mental illness included maternal depression and parental mental illness; education included child learning problems and academic achievement; home environment included problems with heat, water, rodents, mold, or lead paint; and neighborhood environment included green spaces, grocery stores, safety concerns, and transportation access.

*IRR are presented for total number of SDH screened; OR are presented for each individual SDH.

Table 4. Current and Future Social Determinants of Health Screening

Determinant	% Screening	% Plan to Screen	% Total
Mental illness	86	9	95
Education	85	2	87
Food insecurity	71	14	85
Firearm exposure	65	9	74
Financial support	55	17	72
Intimate partner violence	49	18	67
Substance abuse	48	14	62
Parental stress	47	17	64
Child maltreatment	41	22	63
Childcare needs	39	8	47
Home	34	12	46
Neighborhood	32	8	40
Incarceration	22	9	31
Immigration	18	8	26
Health literacy	17	14	31

The percentages of clinics reporting current screening and plans for future screening within 3 years for each social determinant are shown. Mental illness included maternal depression and parental mental illness; education included child learning problems and academic achievement; home environment included problems with heat, water, rodents, mold, or lead paint; and neighborhood environment included green spaces, grocery stores, safety concerns, and transportation access.

responding clinics having a social worker present, clinic directors cite lack of resources to address positive screens as a barrier. These findings suggest the need for innovative restructuring of medical homes.

The routine use of a comprehensive screening tool administered by preclinical staff could greatly enhance workflow. In our study population, free text answers indicate that the Safe Environment for Every Kid questionnaire[16] and the Survey of Well-being of Young Children[30] are the most commonly used. Up-to-date local resource guides could be created and maintained by team members.[31] Health care systems are creating innovative models utilizing undergraduate students, pediatric residents, community partners, and embedded care navigators for this laborious task.[32] Increased integration of medical legal partnerships, counselors, and community health workers, currently present in less than one third of the clinics in this study, might extend the clinician's ability to connect patients to available community resources.[10]

In our exploratory analysis, the overall level of SDH screening in our population does not differ based on clinic staff composition, but the level of screening for the less commonly screened SDH appears higher in clinics employing multidisciplinary teams. For example, clinics with a medical legal partnership are more likely to screen for parental incarceration and immigration status, which are among the least commonly screened SDH. We also note the increased likelihood of screening for environmental factors and childcare needs with the presence of community health workers or outreach specialists. These observations support the hypothesis that the presence of staff with expertise outside of the traditional biomedical model, such as in the legal system or in community resources, may augment the ability of a pediatric clinic to screen for and address SDH.

Opportunities for research abound in this fast-moving field. The SDH domains continue to be redefined as health care organizations strive to create comprehensive screening tools.[33] Further progress toward universal screening requires tools that cover multiple domains but remain sensitive, valid, and concise for an easier and more efficient process. Although SDH screening increases identification and referral rates, resource linkage rates are low[34] and require further evaluation. Medical homes might also choose to study alternative strategies such as screening families for desire for services rather than the SDH themselves, or direct deployment of programs to at-risk populations.[20,35] In addition to restructuring medical homes, reimbursement structures require attention. Except for developmental/autism screening in the first 2 years of life and postpartum depression screening at select visits during infancy, most screening is not covered by payors. Finally, we must continue to gather evidence that demonstrates primary care initiatives targeting SDH ultimately improve health outcomes.

Our study is limited to CORNET pediatric continuity clinics that volunteered to participate. CORNET represents approximately 60% of residency programs in the United States. Because the program response rate for the survey was 41%, the data represent responses from about 25% of US residency programs. This limits generalizability, as there is no assurance that the sample was representative of US residency programs. Our exploratory analysis was also limited by the small sample size and was done solely for the purpose of hypothesis generation. Our results potentially overestimate the level of screening for SDH in pediatric resident continuity clinics, as sites with an interest in screening may have been more likely to participate. Also, because CORNET practices provide medical care to a higher proportion of vulnerable children, there may be greater interest or perceived need to screen in this setting. Institutional screening norms may be similar across clinic sites within the same institution, further overestimating screening and reducing the generalizability of our results. Finally, we postulate that resident continuity clinics enrolled in CORNET are more likely to be familiar with new research on SDH and thus more likely to screen than are practices outside academic medical centers. In spite of the limited generalizability, this study is the first to examine current screening practices for SDH in a group of clinics rather than in a single clinic.

CONCLUSIONS

Although some screening is common in our survey population of CORNET pediatric continuity clinics, universal screening for SDH is not. Screening practices vary across clinics, reflecting the complex nature of screening, including heterogeneity of patient populations, clinic staff compositions, and SDH encountered in the clinic populations. Clinic directors perceive lack of time and resources to address positive SDH screens as the most significant barriers to screening. Future research needs to specify

which SDH elements should be screened for and to determine best practices for screening that will most benefit patients in their medical home.

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.acap.2019.02.008.

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