

**Concise Research Reports****Addressing social determinants of health in an ambulatory setting: quasi-experimental controlled study of a curricular intervention for residents**

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**INTRODUCTION**

Academic medical centers in the USA disproportionately care for low-income populations.<sup>1</sup> Although several medical organizations now recommend social determinants of health (SDH) curricula be incorporated into internal medicine (IM) residency training, programs have been slow to respond.<sup>2–4</sup> While models screening for SDH in adult-care settings have been described,<sup>5</sup> there have been no published trials of SDH education targeting IM residents. We implemented a pilot SDH educational intervention to improve resident knowledge, confidence, and ability to address patients' unmet social needs.

**METHODS**

We conducted this study in two outpatient clinics at Montefiore Medical Center (Bronx, NY). All second-year (PGY2) IM residents ( $N=38$ ) participated in the curriculum from September 2015 through April 2016 (Fig. 1). Third-year (PGY3) IM residents served as a control group. Albert Einstein College of Medicine IRB approved this study.

The curriculum focused on SDH shown to impact health outcomes for which resources were available, including health insurance, food insecurity, housing, transportation barriers, and need for supplemental income/public benefits. Using a trigger-based approach, residents were taught to look for key features of a patient presentation, e.g., multiple missed visits or uncontrolled disease, to assist in identifying social needs. Tools, including resource sheets, a resource website, and advocacy letters, were created for addressing SDH, and available on the residency homepage. Preceptors were invited to participate in a faculty development training session on the trigger-based approach and resource tools.

Residents in the intervention group completed surveys before, immediately after, and 6 months after the intervention. The 6-month survey allowed for comparisons to controls at the same stage of residency training. Surveys assessed barriers to addressing SDH in the clinic and knowledge on underserved populations,<sup>6</sup> confidence identifying and addressing SDH, and self-reports on the proportion of encounters where SDH were identified or addressed. Social work referrals per patient encounter for each resident were calculated using medical records data for the intervention and control groups before and after the intervention. Chi-square, *t* test, Fisher's exact test, and McNemar's test were used to analyze the data (SPSS, v.21 and Microsoft Excel).

**RESULTS**

Thirty-four PGY2 residents (89%) completed the baseline survey. Of those, 94% completed the post intervention survey and 76% completed surveys 6 months later. Of the 39 PGY3 control residents, 36 (92%) completed the survey. The intervention and control groups were similar except more intervention residents reported a childhood experience of difficulty "making ends meet" (24 vs. 6%,  $p=0.04$ ) and prior training (82 vs. 50%,  $p=0.03$ ) and experience working with the underserved (76 vs. 42%,  $p<0.01$ ).

At baseline, a lack of time (86%) and a lack of knowledge (60%) were the most frequently cited barriers to identifying and addressing SDH in the clinic. Post intervention, there were short-term mean gains in knowledge (16.5 vs. 19.6,  $p<0.01$ ), and persistent gains in confidence identifying and addressing SDH at 6 months (2.7 vs. 3.2,  $p<0.01$ ; Table 1). While there was no difference in knowledge between intervention and control residents (17.7 vs. 16.4,  $p=0.23$ ), confidence with SDH was greater in the intervention than the control group (3.2 vs. 2.9,  $p=0.03$ ). Behavior increased post intervention (3.0 vs. 3.3,  $p=0.05$ ) with 50% of residents reporting spending  $\geq 10\%$  more patient encounters addressing SDH 6 months post intervention. There was a 47% decline in social work referrals in the intervention group over the 16-month study period (5.8 vs. 3.1%,  $p=0.01$ ), a change not observed in the control group (3.7 vs. 3.8%,  $p=0.79$ ).

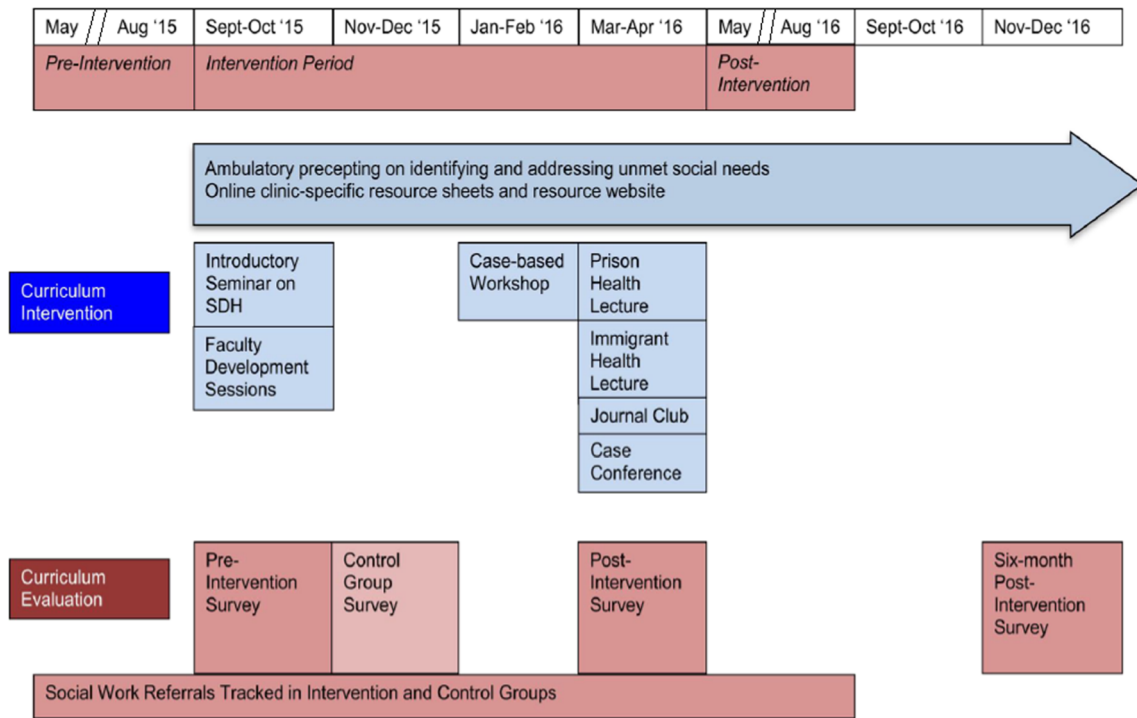


Fig. 1 Timeline of curriculum intervention and evaluation components.

DISCUSSION

Our curriculum improved knowledge, confidence, and practice behavior related to SDH. The decrease in social work referrals may be due to increased self-sufficiency, a hypothesis supported by the lack of change in referrals by control residents during the same time period, and may indicate that similar SDH training could have meaningful benefits in clinics with fewer resources.

Study limitations include its single-institution setting, small sample size, risk for recall and desirability bias on survey responses, and lack of patient outcomes. Continued curricular reinforcement may result in a more sustained impact in individual SDH domains.

Our novel curriculum, using a trigger-based approach and focusing on applicability to patient care, addresses the need for training in SDH to help IM residents better care for their patients. Future work should focus on assessing additional measurable outcomes of resident behavior and clinical outcomes.

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**Compliance with ethical standards:**

Albert Einstein College of Medicine IRB approved this study.

**Conflict of interest:** The authors declare that they do not have a conflict of interest.

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Table 1 Intervention and Control Group Survey Results of Knowledge, Attitudes, and Self-reported Behavior

	A	B	A vs. B	C	A vs. C	D	C vs. D
	Pre-intervention mean	Post intervention mean	Pre-Post <i>p</i> value*	6-month post intervention mean	<i>p</i> value <sup>†</sup>	Control mean	<i>p</i> value <sup>‡</sup>
Knowledge <i>n</i> = 33	16.5	19.6	< 0.01	17.7	0.15	16.4	0.23
Health insurance access ( <i>n</i> = 10)	3.6	4.4	< 0.01	4.4	0.04	3.8	0.13
Social determinants of health ( <i>n</i> = 10)	5.6	5.9	0.26	5.7	0.81	5.1	0.24
Racial disparities ( <i>n</i> = 10)	5.9	7.1	< 0.01	5.9	1.00	5.8	0.87
Incarceration ( <i>n</i> = 3)	1.5	2.3	< 0.01	1.7	0.29	1.8	0.93
Confidence in identifying SDH (overall mean)	2.7	3.1	< 0.01	3.2	< 0.01	2.9	0.03
Insurance status	2.9	3.4	0.12	3.7	< 0.01	3.2	0.08
Out-of-pocket financial costs	2.2	2.2	< 0.01	3.0	< 0.01	2.3	< 0.01
Access affordable/nutritious food	3.0	3.3	0.15	3.2	0.24	3.2	0.88
Transportation to appointments	3.3	3.4	0.85	3.7	0.03	3.4	0.21
Housing conditions and stability	3.0	3.2	0.53	3.4	0.20	2.8	0.03
Eligibility for supplemental income and disability benefits	2.0	3.2	< 0.01	2.4	0.04	2.3	0.96
Confidence in creating a plan to address SDH (overall mean)	2.7	3.1	< 0.01	3.2	< 0.01	2.7	< 0.01
Insurance status	2.8	3.7	< 0.01	3.5	< 0.01	2.4	< 0.01
Out-of-pocket financial costs	2.7	2.6	0.75	3.0	0.24	2.4	0.01
Access affordable/nutritious food	2.5	3.1	< 0.01	3.4	< 0.01	2.7	0.01
Transportation to appointments	3.1	3.5	0.08	3.5	0.04	3.4	0.73
Housing conditions and stability	2.5	3.3	< 0.01	3.0	0.04	2.7	0.14
Eligibility for supplemental income and disability benefits	2.4	2.4	0.89	2.9	0.03	2.6	0.23
Proportion of patient encounters during which some time spent identifying/addressing SDH (overall mean) <sup>§</sup>	3.0	3.3	0.05	3.1	0.45	2.8	0.30
Insurance status/out-of-pocket financial costs	3.1	3.8	0.04	3.5	0.37	3.0	0.14
Access affordable/nutritious food	2.9	3.1	0.46	2.6	0.32	2.6	0.92
Transportation to appointments	3.2	3.5	0.23	3.4	0.24	3.5	0.68
Housing conditions and stability	3.2	3.3	0.68	3.2	1.00	2.5	0.03
Eligibility for supplemental income and disability benefits	2.4	3.1	0.03	2.9	0.14	2.6	0.30

*Italics entries are significant p values*

\*Post intervention scores vs. pre-intervention scores (paired samples *t* test)

<sup>†</sup>6-month post intervention scores vs. pre-intervention scores (paired samples *t* test)

<sup>‡</sup>6-month post intervention scores vs. control scores (independent samples *t* test)

<sup>§</sup>Numbers correspond to a percentage range of patient encounters during the last three ambulatory blocks. 1 = 0%, 2 = 1–5%, 3 = 6–10%, 4 = 11–15%, 5 = 16–20%, 6 = > 20%