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Brief Communication

Physician awareness of social determinants of health documentation capability in the electronic health record

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ABSTRACT

Healthcare organizations are increasing social determinants of health (SDH) screening and documentation in the electronic health record (EHR). Physicians may use SDH data for medical decision-making and to provide referrals to social care resources. Physicians must be aware of these data to use them, however, and little is known about physicians' awareness of EHR-based SDH documentation or documentation capabilities. We therefore leveraged national physician survey data to measure level of awareness and variation by physician, practice, and EHR characteristics to inform practice- and policy-based efforts to drive medical-social care integration. We identify higher levels of social needs documentation awareness among physicians practicing in community health centers, those participating in payment models with social care initiatives, and those aware of other advanced EHR functionalities. Findings indicate that there are opportunities to improve physician education and training around new EHR-based SDH functionalities.

Key words: social determinants of health, electronic health records, documentation, awareness

INTRODUCTION

US healthcare organizations are increasing efforts to identify and intervene on patients' social risk factors as part of a comprehensive strategy to improve health outcomes.^{1–7} As a result, many electronic health record (EHR) platforms now enable structured documentation of both social risk assessment and needs.^{8–12} Storing social data in the EHR can support efforts to improve care decisions and referrals according to patients' social circumstances.¹³ Given the potential benefits, assuring that EHRs have specific fields dedicated to social data has been advanced by key stakeholders, including the

National Academy of Medicine,^{10,11,14} CMS,^{15,16} and the Office of the National Coordinator on Health Information Technology.¹⁷

However, given the breadth of available EHR fields, physicians may not know whether their EHR includes fields to document social determinants of health (SDH),^{18,19} which are defined as “the conditions in which people are born, grow, live, and age” including financial strain and food insecurity.²⁰ Several factors may influence whether or not an EHR system has SDH documentation capability and those have been explored in prior work.²¹ However, we could not identify any prior studies examining whether clinicians are

aware of whether their EHRs have the capability to document SDH in structured format such as SDH modules. Having the EHR capability to assess and store SDH data in a structured format can allow health systems to understand the burden of social needs on a population level, and is often a precondition to providing EHR-based referral interventions (such as referrals to social care resources within the health system or the community).

Clinician awareness may be driven by multiple factors. For example, those physicians who care for safety net populations, those with robust availability of social services, and those incentivized to support social care may be more likely to be aware of SDH fields. Thus, while universal awareness of SDH EHR fields may be an ideal goal to assess clinic rates of patient social needs and how clinicians are responding to them, awareness of SDH documentation tools in the EHR may vary substantially by clinical setting. Since awareness of SDH EHR fields is a prerequisite for their use, we sought to create the first national-level measures of such awareness using a survey of office-based physicians. We then examined associations between awareness and physician, practice, EHR vendor, and other advanced EHR features to target practice- and policy-based efforts to increase awareness and achieve greater medical-social care integration.

MATERIALS AND METHODS

Data sources

We conducted a secondary data analysis using data from the National Electronic Health Records Survey (NEHRS), an annual nationally representative cross-sectional survey of nonfederally employed, office-based physicians in the United States on issues related to EHR adoption, use, and burden.²² The sampling unit was the physician.²² The 2019 survey was fielded from June 14, 2019 to December 11, 2019 with an unweighted response rate of 41%.²² We used data from the most recently available NEHRS (2019) that includes an assessment of SDH documentation capabilities.

Study sample

The 2019 NEHRS sample includes 1524 physicians. We restricted our sample to physicians who report using an EHR ($n = 1372$), as prior work showed that by 2017 80.5% of hospitals had adopted EHRs.²³ We dropped observations with missing values for included variables, resulting in a final sample of 1134 physicians. We used NEHRS-provided survey weights to produce national estimates.

Measures

Our primary outcome measure was respondents' awareness of their EHR's ability to capture SDH data, as measured by the question, "Does the reporting location use a computerized system to: Record social determinants of health (e.g., employment, education)?" This survey question features 3 responses: *Yes*, *No*, and *Don't Know*. We considered those with "awareness" as those answering either "Yes" or "No."

Covariates included physician and practice characteristics known to be associated with EHR use.²⁴ Physician characteristics included medical specialty (primary care, surgery, or medical care), sex (female, male), and age (under 50 years or 50+ years). Practice characteristics included practice size (1 MD, 2–10 MDs, 11–50 MDs, or 50+ MDs), type (private solo or group practice, or other) and ownership (physician or physician group; insurance company, health plan, or HMO; community health center [CHC]; and medical/academic health center; other hospital; other healthcare corpora-

tion; or other). Because participation in public insurance and alternative payment models is likely to influence engagement around SDH initiatives,^{25,26} we included the following payment model participation variables: whether the physician accepts Medicaid; the proportion of patients insured by Medicaid; whether the physician accepts Medicare; and whether the physician participates in any of the following payment models: patient-centered medical home (PCMH),^{27,28} Accountable Care Organization (ACO),^{25,29–31} Pay for Performance (P4P),^{32,33} Meaningful Use,^{17,34,35} Merit-based Incentive Payment System (MIPS),^{36–38} and Advanced Alternative Payment Model (APM).³⁹

We included 2 types of EHR characteristics. The first was vendor to characterize differences in SDH awareness across vendors. Next, to explore associations between SDH awareness and physician's knowledge of their EHR's capabilities, as measured by awareness of other available EHR features, we included indicators of awareness of 5 other functions available in NEHRS and chosen to represent an advanced feature set. These advanced features include those which meet Meaningful Use Stage 2 objectives and those which may be found in comprehensive, but not basic, EHR systems.⁴⁰ These measures—each created from Yes/No/Don't Know responses as described above—reflect physicians' awareness of: (1) whether the EHR could document behavioral determinants of health (BDH),¹¹ (2) patient engagement capabilities (whether the EHR had the capacity to create educational resources tailored to the patients' specific conditions and to exchange secure messages with patients); (3) population management capabilities (whether the EHR had the ability to generate lists of patients with particular health conditions, create reports on clinical care measures for patients with chronic conditions, and create shared care plans that can be made available across the care team); (4) quality measurement capabilities (whether the EHR could send clinical quality measures to public and private insurers); and (5) patient safety capabilities (whether the EHR included the capacity to use computerized provider order entry [CPOE] to order prescriptions, electronically send prescriptions to the pharmacy, provide warnings of drug interactions or contraindications, order lab tests, order radiology tests, and provide reminders for guideline-based interventions or screening tests).

Data analysis

We tabulated sample demographics and then calculated the weighted overall level of awareness of SDH documentation capability in the sample. Next, we examined bivariate associations between the level of awareness and independent variables (physician, practice, and EHR characteristics) using chi-squared tests. We also constructed a multivariable Poisson regression model predicting physician awareness of SDH documentation capability based on all included physician, practice, and EHR characteristics. All analyses were nationally weighted using NEHRS-provided survey weights in Stata 17.0 (StataCorp, College Station, TX).

RESULTS

Sample characteristics

Table 1 presents sample characteristics. Most respondents (49.69%) were primary care physicians, identified as male (68.32%) and were over the age of 50 (74.52%). Most (73.96%) reported working in private practice, in practices with 2–10 physicians (53.33%) and in practices owned by physicians or physician groups (57.43%). While most respondents accepted Medicaid (71.07%) and Medicare

Table 1. Sample demographics (raw counts, weighted proportions, $n = 1134$)

Physician, practice, payment, and EHR characteristics	#	%
Primary care	596	49.69
Surgical care	245	21.87
Medical care	293	28.44
Female	334	31.68
Age 50+ years	782	74.52
Size		
1 MD	202	17.65
2–10 MDs	574	53.33
11–50 MDs	214	16.02
50+ MDs	144	13.01
Private solo or group practice	818	73.96
Ownership		
Physician or physician group	625	57.43
Insurance company, health plan, or HMO	31	2.91
Community Health Center	63	4.56
Medical/Academic health center	162	15.26
Other hospital	116	8.59
Other health care corporation	93	6.99
Other	44	4.28
Accepts Medicaid	884	71.07
Accepts Medicare	997	88.76
Participates in PCMH	340	26.02
Participates in ACO	439	38.17
Participates in P4P	304	31.52
Participates in Meaningful Use	606	52.04
Participates in MIPS	305	30.69
Participates in APM	113	9.27
EHR vendor		
Allscripts	85	6.47
Amazing charts	18	1.37
Athenahealth	80	6.28
Cerner	87	6.4
eClinicalWorks	107	11.13
e-MDs	15	0.8
Epic	278	25.54
GE/Centricity	34	2.27
Modernizing medicine	19	1.5
NextGen	61	6.01
Practice fusion	27	4.33
Sage/Vitera/Greenway	50	2.76
Other	273	25.15
Aware of behavioral determinants of health documentation feature	1112	96.42
Patient engagement capabilities		
Aware of ability to educational resources	1018	89.57
Aware of ability to exchange messages	1075	93.56
Population management capabilities		
Aware of ability to generate lists	845	75.47
Aware of ability to create reports	834	71.98
Aware of ability to create shared care plans	817	71.86
Quality measurement capability		
Aware of ability to send quality measures	699	62.67
Safety capabilities		
Aware of CPOE for prescriptions	1134	100
Aware of ability to send scripts to pharmacy	1132	99.9
Aware of having drug interaction warnings	1074	93.76
Aware of ability to order lab tests	1112	98.24
Aware of ability to order radiology tests	1098	96.06
Aware of guideline reminders	989	86.96

(88.76%) and participated in Meaningful Use (52.04%), fewer than half participated in each of the alternative payment programs (PCMH [26.02%], ACO [38.17%], P4P [31.52%], MIPS [30.69%], or APM [9.27%]).

Awareness of SDH documentation capability and associations with EHR vendor

About 87.85% of respondents were aware of SDH documentation capability availability (Figure 1). Of those with awareness (87.85%), 86.24% of respondents reported having SDH documentation capabilities and 13.76% did not. Levels of SDH documentation capability awareness were similar across different EHR vendors, ranging from 81.38% (GE/Centricity) to 96.71% (Cerner, $P = .55$).

Associations between awareness of SDH documentation capability and physician and practice characteristics

We observed no significant differences in awareness by specialty area, physician sex, or age (Table 2). Respondents working in CHCs (97.98%) reported the highest level of awareness among ownership categories ($P = .011$). There were no significant differences in awareness by clinic size or type. Physicians participating in P4P (94.1%, $P = .016$), MIPS (94.49%, $P < .001$), and APM (99.57%, $P < .001$) had higher levels of awareness compared to those not participating in these programs (Table 2).

Association between awareness of SDH documentation capability and awareness of other advanced EHR capabilities

Respondents who were aware of SDH documentation capabilities were also more likely to be aware of other advanced EHR capabilities. Specifically, we observed a significantly higher level of awareness of SDH documentation among physicians who were also aware of BDH documentation (91.06%, $P < .001$). Similarly, we observed significantly higher levels of awareness of SDH documentation amongst physicians with awareness of nearly all other advanced EHR capabilities, including patient engagement (89.06%, $P = .006$), population management (90.85–90.96%, $P < .005$), quality measurement (93.13%, $P < .001$), and patient safety features (90.17–100%, $P < .001$) relative to physicians without awareness of these features (Table 2).

These results persisted in our multivariate regression model (Supplementary Appendix A).

DISCUSSION

In a national survey of nonfederally employed, office-based physicians, almost 9 in 10 were aware of EHR capabilities to document SDH. But levels of awareness varied significantly by EHR and practice characteristics. Our findings can inform the design of promotion and training activities to maximize use of existing, available SDH capacities. Prior work has used the same data (NEHRS) to explore correlations between SDH use and out-of-hours EHR use and described the proportion of physicians using EHRs with SDH documentation capability.²¹ This work excluded physicians who reported that they did not know if their EHR could record SDH data—which is the key measure in our new analyses. Thus, our ap-

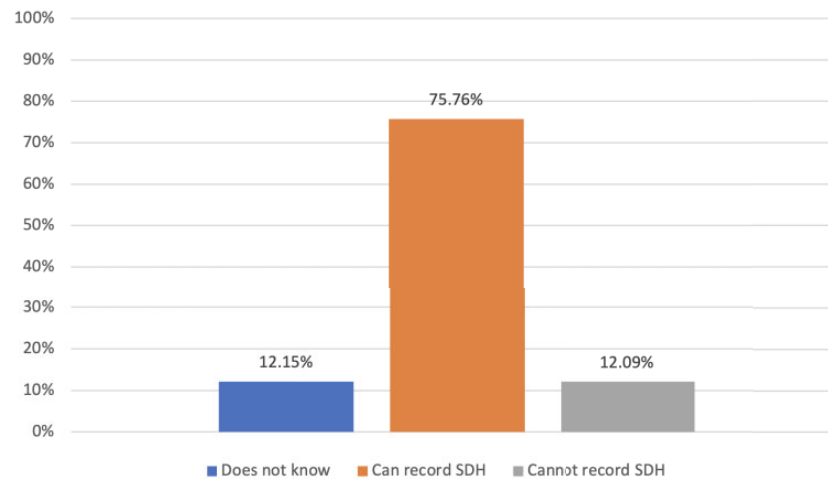


Figure 1. Respondents' awareness of having the ability to record SDH in the EHR (weighted, $n = 1134$).

proach examines a distinct concept (awareness) and simultaneously strengthens the earlier work, which overestimated capability prevalence by excluding respondents that were not aware of these functionalities. In the current study where we intentionally include these respondents, we find lower national estimates. This could inform efforts to identify potential targets for provider training, including medical and surgical specialties, those not participating in alternative payment models, and those unaware of advanced EHR capabilities. We recommend 2 types of changes to increase providers' awareness of SDH capabilities: 1) target training initiatives to providers who are less likely to be aware of SDH capabilities based on practice characteristics; and 2) add survey questions about utilization of SDH documentation tools to future NEHRS administrations.

Despite the increasing focus on SDH screening and social care in the US healthcare settings, physicians' awareness of EHR-based SDH documentation capability varies. Awareness of these capabilities is relevant to direct clinical care. While not all physicians will document social data using the EHR, physicians nonetheless should know that data about patients' health-relevant social conditions are incorporated into their EHR. Ideally, maximizing awareness of EHR SDH data fields will enable more physicians to both review and use SDH data for medical decision-making.^{41,42} On a policy level, awareness could have a direct impact on the design and evaluation of interventions incentivizing the use of documentation and referral capabilities to identify and address patients' social needs more quickly. CMS currently is exploring quality measures reflecting both the prevalence of social risk screening and the prevalence of social risk, and many states have already begun to use or are considering similar quality indicators. Organizational performance on these types of measures is likely to depend on EHR SDH documentation, but lack of awareness about related documentation capabilities introduces some doubt about the reliability of EHR documentation as a source of performance information.^{43,44} High-quality training may facilitate use of advanced EHR capabilities.^{45–51} Associations between SDH awareness and awareness of other advanced EHR capabilities reveal that lack of awareness is not unique to SDH functions and training to increase awareness could therefore target a broad set of these high-value functions.

Against this backdrop, our finding that awareness differs based on practice and EHR characteristics suggests the need for different types of interventions to increase the utilization of documentation

capabilities based on the extent of social care provided by healthcare organizations. Considering the multiple factors that likely influence physicians' awareness of SDH EHR fields, some of the variation in SDH EHR awareness by organizational characteristics likely stems from differences in practice motivation or need to provide social care. Physicians with frequent engagement in screening and social care work may be more likely to be aware of SDH capabilities. For instance, physicians in CHCs, which disproportionately serve low-income patients, were more likely to be aware of these capabilities, likely because they have accrued more expertise related to addressing social needs relative to physicians working in other settings. CHCs have also established other implementation facilitators⁵²—including availability of internal champions, external incentives,⁵³ and both dedicated workforce^{54,55} and workflows^{56,57}—that together can drive awareness of relevant SDH documentation capabilities. Conversely, other practice characteristics (eg, payer-owned clinics and medical centers), however, were associated with lower awareness of SDH documentation capability. Physicians in these organizations with historically less engagement in screening and social care may benefit from targeted educational interventions to increase awareness of SDH capabilities.

Although awareness is a prerequisite to use, it is not the sole or best indicator of use. Moving forward, it will be critical to study the systematic uptake of SDH documentation capabilities⁵⁸ and associated barriers and facilitators. One strategy to track use would be to add new questions to NEHRS that capture rates of documentation and data review, including the proportion of patients screened and the clinic's population denominator; workflows for SDH screening and navigation; and information about the workforce involved in SDH-related screening, documentation, and referral functions.⁵⁹ Together, these data would enable us to identify those characteristics associated with promoting higher levels of use of SDH documentation capabilities.

Limitations

Several key limitations to this dataset should be considered. First, given the binary nature of the survey question assessing SDH documentation capacity, we cannot know whether all respondents interpreted this question in the same way, including what features count as recording SDH, or how one may respond if their EHR supports the documentation of certain social risk factors but not others. Moreover, respondents may have limited understanding of what

Table 2. Associations between awareness of SDH documentation capability and physician, practice, payment, and EHR characteristics (weighted, $n = 1134$)

Physician, practice, payment, and EHR characteristics	Aware	Not aware	<i>P</i> value
Primary care	91.92	8.08	.062
Surgical care	83.59	16.41	
Medical care	83.98	16.02	
Female	87.33	12.67	.842
Male	88.08	11.92	
Under 50 years	85.7	14.3	.456
50+ years	88.58	11.42	
Size			
1 MD	94.16	5.84	.3
2–10 MDs	87.22	12.78	
11–50 MDs	83.78	16.22	
50+ MDs	86.85	13.15	
Clinic type			
Private solo or group practice	88.71	11.29	.363
Other setting	85.39	14.61	
Ownership			
Physician or physician group	88.95	11.05	.011
Insurance company, health plan, or HMO	66.96	33.04	
Community health center	97.98	2.02	
Medical/Academic health center	79.65	20.35	
Other hospital	93.93	6.07	
Other health care corporation	93.54	6.46	
Other	84.05	15.95	
Accepts Medicaid			
Does not accept No	87.22	12.78	.896
Yes	87.9	12.1	
N/A	91.79	8.21	
Don't know	83.78	16.22	
Accepts Medicare	88.88	11.12	.098
Does not accept Medicare	79.72	20.28	
Participates in PCMH	91.5	8.5	.193
Does not participate in PCMH	86.56	13.44	
Participates in ACO	91.64	8.36	.077
Does not participate in ACO	85.51	14.49	
Participates in P4P	94.1	5.9	.016
Does not participate in P4P	84.97	15.03	
Participates in Meaningful Use	89.93	10.07	.207
Does not participate in Meaningful Use	85.58	14.42	
Participates in MIPS	94.49	5.51	.013
Does not participate in MIPS	84.9	15.1	
Participates in APM	99.57	0.43	<.001
Does not participate in APM	86.65	13.35	
EHR vendor			.55
Cerner	96.71	3.29	
NextGen	96.66	3.34	
Sage/Vitera/Greenway	94.94	5.06	
Modernizing medicine	94.23	5.77	
Practice fusion	93.19	6.81	
Allscripts	90.17	9.83	
e-MDs	89.7	10.3	
Other	87.67	12.33	
eClinicalWorks	87.07	12.93	
Amazing charts	83.73	16.27	
Epic	83.33	16.67	
athenahealth	82.99	17.01	
GE/Centricity	81.38	18.62	
Aware of behavioral determinants of health feature	91.06	8.94	<.001

(continued)

Table 2. continued

Physician, practice, payment, and EHR characteristics	Aware	Not aware	<i>P</i> value
Not aware of behavioral determinants of health feature	1.49	98.51	
Patient engagement capabilities			
Aware of ability to educational resources	88.87	11.13	.069
Not aware of ability to educational resources	78.98	21.02	
Aware of ability to exchange messages	89.06	10.94	.006
Not aware of ability to exchange messages	70.18	29.82	
Population management capabilities			
Aware of ability to generate lists	90.96	9.04	.001
Not aware of ability to generate lists	78.24	21.76	
Aware of ability to create reports	90.85	9.15	.004
Not aware of ability to create reports	80.11	19.89	
Aware of ability to create shared care plans	89.6	10.4	
Not aware of ability to create shared care plans	83.35	16.65	.087
Quality measurement capability			
Aware of ability to send quality measures	93.13	6.87	<.001
Not aware of ability to send quality measures	78.93	21.07	
Safety capabilities			
Aware of CPOE for prescriptions	87.85	12.15	
Not aware of CPOE for prescriptions	0	0	N/A
Aware of ability to send scripts to pharmacy	87.83	12.17	
Not aware of ability to send scripts to pharmacy	100	0	.636
Aware of having drug interaction warnings	88.66	11.34	
Not aware of having drug interaction warnings	75.55	24.45	.061
Aware of ability to order lab tests	87.93	12.07	
Not aware of ability to order lab tests	83.37	16.63	.552
Aware of ability to order radiology tests	88.31	11.69	
Not aware of ability to order radiology tests	76.62	23.38	.136
Aware of guideline reminders	90.17	9.83	
Not aware of guideline reminders	72.24	27.76	<.001

The bolded *P* values are significant at the $P < .05$ level.

SDH are and the NEHRS SDH documentation question offers only 2 examples (employment, education) that may not be maximally relevant to practice. Further, because of social desirability bias, respondents may over-report awareness.⁶⁰ Additionally, NEHRS does not currently measure physicians' actual use of EHR SDH documentation. Furthermore, the data are limited to physician respondents, though other members of the care team, such as social workers and patient navigators, may be the primary users of SDH documentation capability, we were unable to capture a broader measure of awareness. Finally, some of the statistically significant findings observed in Table 2 may be a result of chance through multiple comparisons.

CONCLUSION

As our healthcare system pursues increased social risk screening and related intervention activities, it is reassuring that almost 90% of physicians are aware of EHR SDH documentation capability. Variation in awareness can be used to inform future efforts to facilitate uptake.

AUTHOR CONTRIBUTIONS

BEI contributed to the conception and design of this study, data collection, data analysis and interpretation, drafting the article, critical revision of the article, and final approval of the version to be published. He agrees to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. MSP contributed to the conception and design of this study, data interpretation, drafting the article, critical revision of the article, and final approval of the version to be published. He agrees to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. JA-M contributed to the conception and design of this study, data interpretation, drafting the article, critical revision of the article, and final approval of the version to be published. She agrees to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. LMG contributed to the conception and design of this study, data interpretation, drafting the article, critical revision of the article, and final approval of the version to be published. She agrees to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Journal of the American Medical Informatics Association* online.

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CONFLICT OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY

The data underlying this article are available from the CDC National Center for Health Statistics, at: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NEHRS/.

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