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Leveraging Technology and Workflow Optimization for Health-Related Social Needs Screening: An Improvement Project at a Large Health System

Nelly Angah, MHA, MPH, PMP; Bridget Meedzan, MPH; Natacha Pruzinsky, MSHI; Andrew O'Connell, MPH; Louis Hart, MD; Darcey Cobbs-Lomax, MBA, MPH; Polly Vanderwoude, MHSA, FACHE

Background: The collection of health-related social needs (HRSN) data at one large health system has historically been inconsistent. This project was aimed to increase annual HRSN screening rates by standardizing data collection in the electronic health record (EHR) through optimized clinical workflows.

Methods: The authors designed a standard screening questionnaire in alignment with the Accountable Health Communities model, and they conducted interviews with eleven US-based health systems and one medical center on best practices for ambulatory HRSN screening and interventions, which identified five possible methods to administer the questionnaire. After testing, the authors opted to send questionnaires to patients through the patient portal three days prior to an ambulatory visit. For inpatients, in-person interviews were implemented. Staff implementing the updated processes included registered nurses, social workers, preventive health coordinators, and community health workers.

Results: The annual screening rate for all active ambulatory patients increased from 0.4% to 15.9% ($p < 0.001$), and 10.7% of all patients had at least one health-related social need. The annual screening rate for inpatients was estimated to be zero at baseline and increased by 66 percentage points ($p < 0.001$). The most prevalent health-related social need in both settings was financial resource strain, followed closely by food insecurity.

Conclusion: Well-designed interventions and technology support were effective in achieving improved screening and data collection. Leadership support, building interventions within preexisting workflows, and ensuring standard data capture in the EHR were key factors leading to successful process improvement.

BACKGROUND

Problem Description and Available Knowledge

Social conditions that shape daily life have a significant impact on health outcomes. According to the County Health Rankings model, 80% of health outcomes are driven by nonmedical factors such as health behaviors, socioeconomic conditions, and the physical environment.[1] Historically, screening for nonmedical data—referred to as health-related social needs (HRSN)—at Yale New Haven Health System (YNHHS) has been highly variable. Prior to January 2022, HRSN data were limited to what was collected through the Community and Clinical Integration Program (CCIP) and Accountable Health Communities (AHC) grants. Though progress has been made, more than 70% of hospitals in the United States do not have processes in place to screen for HRSN.[2]

Rationale

Previous studies have correlated unmet HRSN with poor adherence to care plans, adverse health outcomes, and increased costs of care.[3] Prioritizing the collection of HRSN data in the electronic health record (EHR) as standard clinical practice is essential to understanding the nuances of patient need and how it may affect health disparities.[4]

Specific Aims

This improvement project aimed to increase the consistent collection of HRSN data in the EHR through the design and implementation of standard processes to screen patients for HRSN across ambulatory and inpatient settings. The key indicators to assess performance are ambulatory and inpatient comprehensive annual screening rates.

METHODS

Context

YNHHS supports the health and well-being of patients residing primarily in Connecticut, southern Rhode Island,

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and parts of southern New York. The health system consists of five acute care hospitals—Yale New Haven Hospital, Bridgeport Hospital, Lawrence and Memorial Hospital, Greenwich Hospital, and Westerly Hospital—a multispecialty medical foundation, Northeast Medical Group (NEMG); and several other multispecialty centers, outpatient locations, and ambulatory sites.

In 2016 the state of Connecticut awarded the CCIP grant to NEMG to address complex health needs, behavioral health integration, and other health equity initiatives. To meet CCIP standards, six primary care practices at NEMG hired internal teams of community health workers (CHWs) to lead HRSN screening and resource navigation. Referred patients included those who had a diagnosis of type 2 diabetes and were previously engaged with nursing care coordinators prior to the grant. Screenings were conducted over the phone by CHWs and undergraduate volunteers using the Health Leads Screening Toolkit.[5] The CCIP grant ended in January 2020.

Beginning in November 2018 Yale New Haven Hospital was one of 28 organizations nationally that participated in the AHC Model through the Centers for Medicare & Medicaid Services (CMS) Innovation Center. Under this model, Yale New Haven Hospital partnered with one Federally Qualified Health Center and a local nonprofit organization, Project Access of New Haven, to screen New Haven residents for HRSN following an emergency department discharge. Under the AHC model, screening was limited to Medicare, Medicaid, and dual-eligible patients. The AHC grant officially ended on April 30, 2023.

As participation in the CCIP and AHC grants progressed, YNHHS established a Social Drivers of Health Steering Committee in January 2019 to oversee the strategy and advancement of aligned initiatives related to HRSN. The following year, YNHHS's Epic EHR launched the Social Determinants of Health (SDOH) Wheel—a flowsheet tool that allows providers and other clinical support staff to assess 11 domains of HRSN: financial strain, housing stability, food insecurity, medical and nonmedical transportation, tobacco use, depression, stress, physical activity, intimate partner violence, social connections, and alcohol use.

In October 2021 the Steering Committee endorsed the use of a standard HRSN screening questionnaire that assesses 4 core HRSN domains of the 11 available in the Epic SDOH wheel. The selected core domains are food insecurity, medical and nonmedical transportation, financial strain, and housing stability.

The standard HRSN screening questionnaire includes seven questions across the four core domains, and all questions, except for nonmedical transportation, come from the AHC screening tool (Table 1). The question assessing nonmedical transportation access comes from the Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences (PRAPARE) survey. The Steering Committee's endorsement of the standard HRSN screening questionnaire was based on guidance received from the Connecticut Hospital Association and alignment with the AHC screening tool.[6] Designing a standard HRSN screening questionnaire is essential to this improvement project because it allows HRSN data to be captured and stored in the Epic EHR in a standard, discrete format, regardless of user or department location. Three of the core domains were built as part of Epic's default SDOH Wheel; however, the housing domain was custom-built by YNHHS. Risk stratifications for each domain are generated by Epic based on a patient's response. These risk stratifications are shown in Table 1 and are used during data analysis to identify patients with HRSN.

In the summer of 2022 the strategic plan was expanded to include all hospital-based inpatient departments to align with the following reporting requirements and compliance standards:

- Hospital Inpatient Quality Reporting (IQR) standards outlined in the Hospital Inpatient Prospective Payment System (IPPS) fiscal year (FY)2023 final rule published by CMS[7]
- Leadership (LD) Standard LD.04.03.08, Element of Performance (EP) 2, published by The Joint Commission. At the time of this article's publication, the standard was elevated to National Patient Safety Goal (NPSG.16.01.01)[8]

Historically at YNHHS, Social Work consultations and Nursing assessments have played an important role in addressing HRSN. Given their unique skill set, social workers are well positioned to connect patients to community resources using patient-centered, trauma-informed care.[9] In addition, Nursing assessments historically assessed food insecurity, transportation access, and housing stability. Nurses are trustworthy allies to patients and can collect sensitive HRSN data to facilitate improved postdischarge care management.[10] For these reasons, social workers and nurses were identified as key stakeholders in the rollout of hospital-based HRSN screening. However, the original Social Work consultation and Nursing assessment formats varied from the recommended standard HRSN screening questionnaire.

Ambulatory Intervention

The ambulatory interventions discussed below chronicle the piloting and large-scale adoption of the standard HRSN screening questionnaire and optimized workflows at 48 NEMG primary care departments. The outreach methodology used to administer the standard screening questionnaire was selected using qualitative interview findings and Plan-Do-Study-Act (PDSA) process improvement cycles.

Beginning in 2019 qualitative interviews were conducted with eleven US-based health systems and one medical center on best practices for ambulatory HRSN screening and interventions. The findings of these interviews out-

Table 1. Standard Health-Related Social Needs (HRSN) Screening Questionnaire*

Domain Questions and Response Options	Epic Risk Stratification	HRSN Status
Housing: What is your living situation today?		
I have a steady place to live.	Low	No HRSN
I have a steady place to live today, but I am worried about losing it in the future.	Medium	HRSN Present
I do not have a steady place to live.	High	HRSN Present
Housing: Do you have problems with any of the following: pests such as bugs; mold; lead paint or pipes; water leaks; oven or stove not working		
None	Low	No HRSN
One or more problems present	Medium	HRSN Present
Food Insecurity: Within the past 12 months, you worried that your food would run out before you got money to buy more . . .		
Never True	No Food Insecurity	No HRSN
Sometimes True	Food Insecurity Present	HRSN Present
Often True	Food Insecurity Present	HRSN Present
Food Insecurity: Within the past 12 months, the food you bought just didn't last and you didn't have money to get more, , ,		
Never True	No Food Insecurity	No HRSN
Sometimes True	Food Insecurity Present	HRSN Present
Often True	Food Insecurity Present	HRSN Present
Financial Strain: How hard is it for you to pay for the very basics like food, housing, medical care, and heating?		
Not Hard at All	Low	No HRSN
Not Very Hard	Low	No HRSN
Somewhat Hard	Medium	HRSN Present
Hard	High	HRSN Present
Very Hard	High	HRSN Present
Transportation Needs: In the past 12 months, has a lack of transportation kept you from medical appointments or from getting medications?		
No	No Transport Needs	No HRSN
Yes	Unmet Transport Needs	HRSN Present
Transportation Needs: In the past 12 months, has a lack of transportation kept you from meetings, work, or getting things needed for daily living?		
No	No Transport Needs	No HRSN
Yes	Unmet Transport Needs	HRSN Present

* The questionnaire shows the questions included in each core domain and the available responses. In the Epic electronic health record Social Determinants of Health Wheel, the patient's response generates a color-coded risk stratification for each domain. Patents are identified to have a health-related social need based on the Epic-generated risk stratification.

lined five potential outreach methods that could be used to administer the standard HRSN screening questionnaire. The outreach methods are listed in Table 2 and include telephone, paper, tablet, and the Web-based patient portal MyChart. The health systems and medical center that were interviewed include Montefiore Health, Mayo Clinic, Intermountain Health, Mass General Hospital, Mount Sinai Hospital, Metro Health Hospital, NYC Health + Hospitals, Ochsner Health and Boston Medical Center, and Ochsner Health. Most health systems interviewed administer HRSN screenings during in-person encounters, using electronic or paper aids. In addition, the patient populations targeted for screening ranged from clinically high-risk to those seen for preventive care visits.

Between January and September 2022, five PDSA cycles were conducted across 22 NEMG primary care departments to evaluate the response rates for the five outreach methodologies. Practices were selected based on the availability of preventive health coordinators (PHCs) to support outreach efforts and CHWs to facilitate resource navigation when needed. PHCs are nonclinical team members who support gap in care closure and practice-based quality workflows. All outreach methods used the standard HRSN screening questionnaire; however, the target population and the time of outreach varied across the cycles.

In the first two PDSA cycles, the initial target populations were patients identified as high-risk according to the Mortality Risk Score developed internally at NEMG. This population was targeted for outreach first because they were already receiving PHC services, such as follow-up phone calls, prior to the PDSA cycles. In subsequent cycles, the standard HRSN questionnaire was added to the previsit Annual Wellness Visit (AWV) screener sent to patients through MyChart. This optimization expanded the inclusion criteria to NEMG patients with an upcoming AWV.

The outreach method with the highest response rate was tablet-based questionnaires provided at the time of AWV check-in by front desk staff. The tablet configuration does not require patients to have an activated MyChart account to complete the questionnaire. However, due to the limited

Table 2. Timeline of the Five PDSA Process Improvement Cycles Completed During the NEMG Pilot, and the Screening Rate Observed for Each Methodology Tested

Cycle No.	Cycle Dates (2022)	Tested Outreach Methodology	Target Patient Population	Response Rate, %
1	1/28–2/27	Telephone-based screening conducted by PHCs	High-risk patients identified using the NEMG Mortality Risk Score	39.5 ($n = 563$)
2	3/4–3/22	Standard Screening Questionnaire manually sent by PHCs via MyChart messaging in the patient portal and telephone follow-up by PHCs	Patients due for an AWV	39.9* ($n = 144$)
3	3/28–9/30	Standard Screening Questionnaire automatically sent via MyChart messaging in the patient portal three days prior to an AWV	Patients with an upcoming AWV	32.2* ($n = 244$)
4	4/4–4/15	Paper-based standard screening questionnaires provided to patients at appointment check-in by front desk staff	Patients checking in for an AWV	79.7% ($n = 767$)
5	5/30–9/30	Tablets provided at appointment check-in by front desk staff. Patients use the tablets to complete the standard screening questionnaire on the MyChart patient portal, regardless of account activation status.	Patients checking in for an AWV	89.9% ($n = 87$)

* 85.3% of eligible NEMG patients have an activated MyChart account.
PDSA, Plan-Do-Study-Act; NEMG, Northeast Medical Group; PHC, preventive health coordinator; AWV, Annual Wellness Visit.

availability of tablets, a different outreach approach was endorsed by the Steering Committee that prioritized reducing staff burden and leveraging an automated workflow. The outreach approach ultimately endorsed by the Steering Committee was automatic MyChart messaging sent three days prior to an AWV. To improve accessibility, the standard HRSN screening questionnaire sent via MyChart messaging was made available in English and Spanish. According to Epic demographic data, Spanish is the most preferred non-English language for NEMG–attributed patients.

In October 2022 the NEMG operational and clinical leadership approved the following next steps for the standard screening questionnaire and endorsed outreach methodology:

a. Scale automatic MyChart messaging outreach to all primary care departments at NEMG.
b. Expand questionnaire outreach to other visit types, including annual physical (AP) visits.
c. Include a fifth section of the questionnaire to allow patients to request or decline assistance for a social need(s).

Between December 2022 and January 2023, primary care departments were prioritized for scaling based on provider panel size, value-based care (VBC) contract size, geographic region, and CHW capacity. Departments with a larger VBC contract size were prioritized because increased HRSN screening may provide insights on how to better manage care for these patient populations and opportunities to improve the quality of the care while reducing costs.[11] Large-scale adoption of the standard outreach and screening methodology began in January 2023 at prioritized departments. As of September 2023, 48 total primary care departments at NEMG have been scaled to send the standard HRSN questionnaire via automatic MyChart messaging prior to an AWV or AP. In addition, all patients can request a specialist follow-up during an HRSN screening via MyChart. When a follow-up for assistance is requested, a notification is sent automatically to the CHW team, and the patient is contacted to review HRSN screening results.

Inpatient Interventions

The inpatient interventions discussed below include the optimization of the Social Work consultation and Nursing assessment to align with the standard HRSN screening questionnaire and the rollout of HRSN screening at all hospital-based locations.

Following endorsement from YNHHS clinical and operational leadership to expand HRSN screening to all inpatient departments, Social Work teams modified the hospital-based consultation in the EHR to reflect the standard HRSN screening questionnaire. In June 2022 Social Work in all hospital-based and outpatient departments began in-person screening of adult patients 18 years of age or older for HRSN when the admitting provider ordered a Social Work consult.

In February 2023 the Nursing team modified their hospital-based assessment to include all four core domains from the standard HRSN screening questionnaire. Nurs-

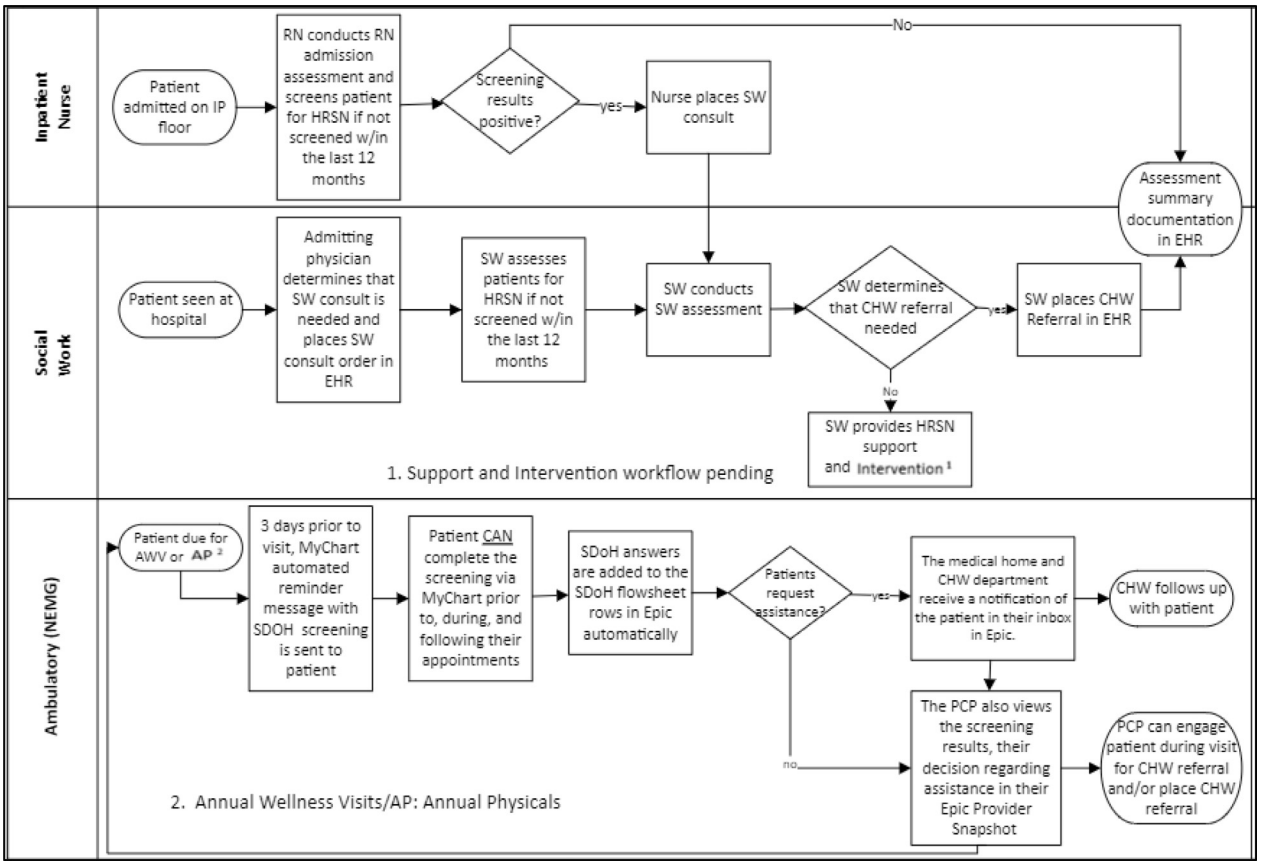

Figure 1: This process map shows ambulatory and inpatient screening processes (standardized), as well as referral management and resource navigation services (nonstandardized) as of September 2023. IP, inpatient; HRSN, health-related social needs; SW, Social Work; EHR, electronic health record; CHW, community health worker; NEMG, Northeast Medical Group; SDOH, social determinants of health; PCP, primary care provider.

ing teams complete the standard HRSN screening questionnaire in person during the admission assessment for all patients 18 years of age and older.

Referral management and other efforts to address identified needs are led by Social Work and CHW teams. These workflows continue to be developed and are not the key focus of this improvement project. However, it is important to note that the purpose of this improvement project is to increase HRSN screening to address unmet patient needs. Referral management efforts and other resource connectivity workflows are tailored to the specific needs and conditions of each patient, and we look to improve and standardize these processes in the future.

For inpatient screenings conducted by Social Work that result in identified need, Social Work manages the HRSN support directly. For ambulatory screenings that result in identified HRSN, the CHWs are automatically notified in the EHR of the request for follow-up and act on that request. For inpatient screenings conducted by Nursing, a Best Practice Advisory (BPA) is built in the Epic EHR to prompt Nursing teams to submit a Social Work consultation when patients screened are identified to have HRSN in any of the four core screening domains. The BPA pathway was integrated into the standard Nursing HRSN screening workflow at all hospital-based departments. The standard HRSN screening workflow and current iteration of referral management and resource navigation processes are shown in Figure 1.

Measures

The project aim was to increase comprehensive annual HRSN screening rates. The ambulatory comprehensive annual screening rate measure is based on all active primary care patients at NEMG. The inpatient comprehensive annual screening is based on the Screening for Social Drivers of Health measure published by CMS in the Hospital IQR Program FY2023 final rule.[7] We also tracked ambulatory and inpatient comprehensive and domain-specific HRSN positivity rates, which are discussed in more detail in Table 3. Throughout the data collection process, manual sampling verification was used to confirm accuracy and completeness. A Tableau dashboard (Tableau Software, LLC, Seattle) is used for workflow auditing, data validation, and stakeholder communication.

Table 3. HRSN Process and Outcome Measures in Ambulatory and Inpatient Settings at YNHHS

Measure Type	Measure Name	Operational Definition
Process Measures	Ambulatory Comprehensive Screening Rate	The percentage of active, unique patients of all ages who were seen by an NEMG PCP or OB/GYN within the last two years and screened for *all* four core domains or chose not to disclose information for HRSN screening for all four core domains in the last 12 months.
	Inpatient Comprehensive Screening Rate	The percentage of unique patients 18 years of age and older who were admitted to an inpatient hospital stay in the last 12 months and were screened for *all* four core domains anytime in the last 12 months. *Patients who opt out of screening or who are themselves unable to complete the screening and do not have a legal guardian or caregiver able to do so on the patient's behalf are excluded.*
Outcome Measures	Ambulatory Comprehensive Positivity Rate	The percentage of active, unique patients of all ages who were seen by an NEMG PCP or OB/GYN within the last two years and have an HRSN screening that resulted in a medium or high Epic-generated risk stratification for at least one core domain in the last 12 months.
	Inpatient Comprehensive Positivity Rate	The percentage of unique patients 18 years of age and older who were admitted to an inpatient hospital stay in the last 12 months and have an HRSN screening that resulted in a medium or high Epic-generated risk stratification for at least one core domain in the last 12 months.
	Domain-Specific Positivity Rates *(Ambulatory and Inpatient)*	Ambulatory: The percentage of active, unique patients of all ages who were seen by an NEMG PCP or OB/GYN within the last two years and have an HRSN screening that resulted in a medium or high Epic-generated risk stratification for each of the four core domains. *This measure will consist of four separate rates for each core domain.* Inpatient: The percentage of unique patients 18 years of age and older who were admitted to an inpatient hospital stay in the last 12 months and have an HRSN screening that resulted in a medium or high Epic-generated risk stratification for each core domain anytime in the last 12 months. *This measure will consist of four separate rates for each core domain. Patients who opt out of screening or who are themselves unable to complete the screening and do not have a legal guardian or caregiver able to do so on the patient's behalf are excluded.*

HSRN, health-related social needs; YNHHS, Yale New Haven Health System; NEMG, Northeast Medical Group; PCP, primary care provider; OB/GYN, obstetrician/gynecologist.

Analysis

Shewhart control charts show the changes in screening rates over time and were used to draw inferences from the data. Control lines contextualize trends in the average change over time and shift according to intervention milestones, showing net increases or decreases in the measure of interest. Statistical analyses are used to test whether a difference exists between the proportion of patients screened for HRSN before and after an intervention. Comparing the calculated test statistic, z, to the critical z-value, z_{crit}, and evaluating the resulting p value inform whether statistically significant differences exist between the two population proportions. A statistically significant difference helps to identify whether the screening rate has increased after each intervention.

The baseline ambulatory screening rate was 0.4% ($n = 979$) and shows the total proportion of NEMG patients screened during FY2021 prior to standardization. Baseline inpatient performance was valued at zero because no preexisting processes were in place to screen for HRSN during an inpatient stay prior to this improvement project.

At baseline, 19.5% ($n = 191$) of NEMG patients screened for all four core domains were identified to have at least one health-related social need. Due to the nonstandard nature of HRSN programming during this period, the trends in screening vary by domain. For example, although 979 NEMG patients were screened for all four core domains during the baseline period, the total number of patients screened for each separate domain ranges from 1,100 to 3,550. Considering the varied domain-specific screening patterns, the most prevalent need among patients was identified to be financial resource strain ($n = 297$).

RESULTS

As of September 2023, the ambulatory and inpatient comprehensive annual HRSN screening rates are 15.9% ($n = 40{,}294$) and 66.0% ($n = 45{,}875$), respectively. Compared to ambulatory baseline values from FY2021, these process measures have increased by 15.5 percentage points for ambulatory screening settings and almost 66 percentage points for inpatient settings. As of September 2023, 10.7% ($n = 4{,}328$) of ambulatory patients and 15.7% ($n = 1{,}194$) of admitted inpatients were screened and identified to have at least one health-related social need. The most prevalent health-related social need in both settings continues to be

Table 4. Process and Outcome Measure Performance for Ambulatory and Inpatient Screening Interventions During the Measurement Period 10/1/2022–9/30/2023

	Ambulatory		Inpatient	
	Rate (%)	Volume	Rate (%)	Volume
Comprehensive Screening	15.9	40,294	66.0	45,875
Comprehensive Positivity	10.7	4,328	15.9	7,194
Domain-Specific Financial Resource Strain Positivity	6.5	2,721	9.4	4,347
Domain-Specific Food Insecurity Positivity	4.4	1,812	9.4	4,316
Domain-Specific Housing Instability Positivity	3.4	1,552	4.6	3,054
Domain-Specific Transportation Access Positivity	1.6	657	4.3	1,996

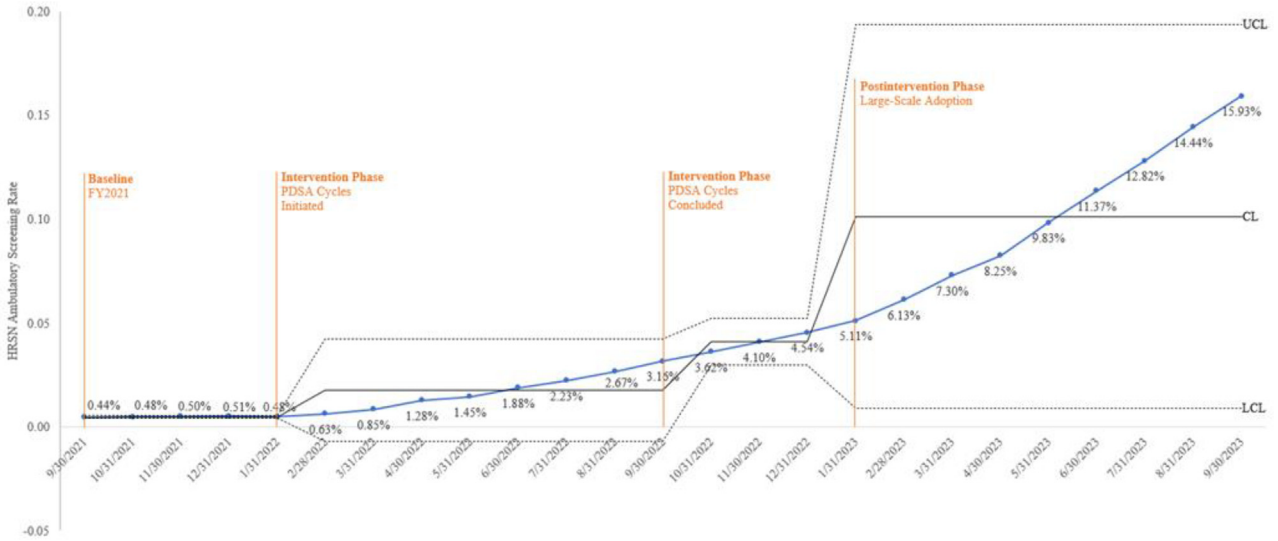

Figure 2: This Shewhart p-chart shows the annual ambulatory health-related social needs (HRSN) screening rate among all Northeast Medical Group–attributed patients (rolling 12 months) with intervention milestone markers. UCL, upper control limit; FY, fiscal year; PDSA, Plan-Do-Study-Act; CL, center line; LCL, lower control limit.

financial resource strain, followed closely by food insecurity. See Table 4.

The control charts in Figures 2 and 3 identify effective interventions contributing to statistically and significantly improved screening rates. We identified special cause variation associated with the spread of systematic ambulatory screening to 48 primary care departments, and with inpatient screening upon optimizing Social Work consultation and Nursing assessments. These special cause variations are the interventions applied to the preexisting ambulatory and inpatient workflows, denoted by an orange milestone marker. Common cause variability is indicated by no data points falling outside the control limits, representing a stable postintervention process that is experiencing random, predictable noise.

Two-sample z-tests for the difference of proportions were conducted to evaluate improvement. These findings confirmed significant improvement associated with the ambulatory implementation during the fifth PDSA cycle (FY2022), $|z| = 68.4$, $p < 0.001$ (Table 5a); after the large-scale adoption of the ambulatory screening standard across 48 primary care departments (FY2023), $|z| = 154.6$, $p < 0.001$ (Table 5b); and in the proportion of admitted patients screened for HRSN after the optimization of Social Work consultations and Nursing assessments, $|z| = 192.9$, $p < 0.001$ (Table 6).

DISCUSSION

The ambulatory and inpatient interventions implemented by teams at YNHHS between January 2022 and February 2023 improved the comprehensive annual screening rate and initiated HRSN screening as a standard clinical practice during preventive primary care visits and inpatient stays.

At the time of this article, Yale New Haven, Bridgeport, and Greenwich Hospitals had been surveyed by The Joint Commission between February and May 2023 and met EP 2 compliance standards according to Leadership Standard LD.04.03.08.[8] The survey assessed the organization's health equity strategy, specifically the processes in place to assess patients' HRSN in the hospital units at the time of admission. The surveyors recognized the improved screening rates achieved in a relatively short implementation period.

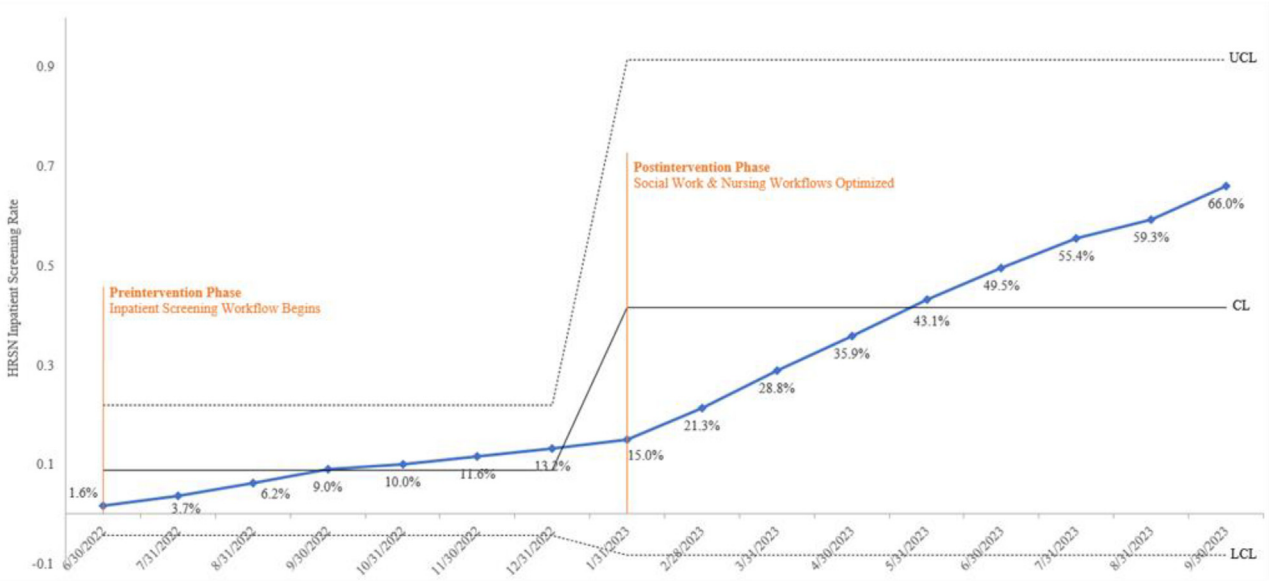

Figure 3: This Shewhart p-chart shows the annual inpatient health-related social needs (HRSN) screening rate among all hospital discharges (rolling 12 months) with intervention milestone markers. UCL, upper control limit; CL, center line; LCL, lower control limit.

Table 5. Difference in the Proportion of Patients Before and After Each Ambulatory Intervention*

a. FY2021 vs. FY2022†		b. FY2022 vs. FY2023‡	
Sample 1 Favorable Cases (x_1)	979	Sample 1 Favorable Cases (x_1)	8,008
Sample 1 Size (n_1)	220,626	Sample 1 Size (n_1)	253,193
Sample 1 Proportion (p_1)	0.0044	Sample 1 Proportion (p_1)	0.0316
Sample 2 Favorable Cases (x_2)	8,008	Sample 2 Favorable Cases (x_2)	40,294
Sample 2 Size (n_2)	253,193	Sample 2 Size (n_2)	252,961
Sample 2 Proportion (p_2)	0.0316	Sample 2 Proportion (p_2)	0.1593
Pooled Population Proportion ($\hat{p}$)	0.0189	Pooled Population Proportion ($\hat{p}$)	0.0954
Test statistic, z	-68.444	Test statistic, z	-154.616
z_{crit}	1.9600	z_{crit}	1.9600
p value ($\alpha = 0.05$)	< 0.001	p value ($\alpha = 0.05$)	< 0.001
Confidence interval (95%)	-0.0279 – 0.0265	Confidence interval (95%)	-0.1293 – 0.126

* Two-sample z-test was used.
† Plan-Do-Study-Act process improvement cycles.
‡ Large-scale adoption of administering the standard health-related social needs questionnaire through automatic MyChart messaging to 46 primary care departments at Northeast Medical Group.
FY, fiscal year.

The strengths of the improvement project include operational and clinical leadership support, regulatory reporting preparedness, and the use of automated messaging that integrates directly into the EHR (ambulatory) and preexisting clinical workflows (inpatient).

First, operational and clinical leaders are key catalysts of process improvement initiatives. Shahian et al. argue that "assuring widespread, consistent adoption and sustaining this over time requires that it be embedded within the organisational culture."[12(p. 768)]

The use of automated MyChart messaging in the ambulatory screening setting was a strength of this process improvement project because it ensured that all HRSN data would be collected and stored in a standard way within the EHR. Studies have shown that synchronized collection of HRSN data in the EHR can improve care management strategies, problem identification, and treatment plans.[2] Using a patient-facing tool allows patients to answer sensitive questions in the location and privacy of their choosing. Further, the automation decreases the amount of support staff labor that is usually required when adding a new questionnaire to the clinical workflow. Although 85.3% of eligible NEMG patients have an activated MyChart account, it is important to continue assessing equitable access to screening services during future process improvement cycles.

Table 6. Difference in the Proportion of Patients Before and After the Optimization of the Social Work Consultations and Nursing Assessments Used During Inpatient Admission*

January 2023 vs. September 2023	
Sample 1 Favorable Cases (x_1)	10,231
Sample 1 Size (n_1)	68,419
Sample 1 Proportion (p_1)	0.1495
Sample 2 Favorable Cases (x_2)	45,875
Sample 2 Size (n_2)	69,531
Sample 2 Proportion (p_2)	0.6598
Pooled Population Proportion ($\hat{p}$)	0.4067
Test statistic, z	-192.915
z_{crit}	1.9600
p value ($\alpha = 0.05$)	< 0.001
Confidence interval (95%)	-0.5147 – 0.5059

* Two-sample Z-test was used.

Finally, the use and optimization of preexisting clinical workflows is a strength of this project because we adapted standards that enhanced—and never replaced—the workflows that work best for our dedicated clinical teams. This means that the modifications to existing Social Work and Nursing workflows were implemented with the time, resources, clinical expertise, culture, and capacity of our clinicians in mind.

Considerable modifications to established workflows are not always easy to implement without a culture shift, and workflow changes can be disruptive to care team members.[12] At YNNHS, the Nursing and Social Work teams shared a prerequisite understanding of the importance of HRSN data in providing holistic care and remediating health disparities. To further prevent disruptions, Nursing teams were empowered to pursue motivational interview skills training prior to intervention. Nursing leaders also opted to release the HRSN–related workflow changes during the scheduled Epic EHR upgrade to minimize change fatigue. Additional training courses are introduced at Nursing Governance meetings and prerecorded for future review and onboarding.

Challenges

The most pertinent challenges experienced during this process improvement project included supply limitations and the lack of a standardized workflow and data collection strategy for resource navigation and connectivity services following a positive HRSN screening.

The outreach methodology with the highest response rate was the use of pre-visit MyChart screening via tablets at the time the patient checked in for their appointment. The tablets allowed patients to complete the questionnaire in the waiting room, regardless of MyChart account activation status. However, supply of tablets was limited due to cost and maintenance requirements. In the future, we will evaluate procurement of more tablets and screening technology via patient smartphone or hospital room televisions.

Second, there is currently no standard workflow to measure, monitor, and evaluate the provision of resource navigation and connectivity services from the time a patient's need is identified to when the need is met. As Beidler et al. explain, health systems traditionally relied on informal approaches such as printed lists of community-based organizations or the personal experience of clinicians to determine where to navigate patients with HRSN.[13] Resource connectivity platforms have become more widely available and allow users to discretely track and trend resource navigation efforts and closed-loop referral data. To measure and track the impact of these efforts, we hope to design future process improvement using connectivity platforms and HRSN–related quality measures developed by the National Committee for Quality Assurance[14] and other national stewards.

Limitations

There were limitations to this study that may affect the generalizability of the findings beyond the walls of YNHHS. The ambulatory patient population was healthy and engaged with a primary care provider. The inpatient screening process lacked two domains (interpersonal violence, utilities) required by CMS as of January 2024.[7] The HRSN process as implemented here relied on unique staff roles—PHCs and CHWs—which may not be available in all settings. Patients may have been unusually willing to complete the HRSN screening questionnaire due to increased social stress during the COVID-19 pandemic. A final limitation is that the design team did not have access to patient collaboration and input during this project.

CONCLUSION

Enhanced technology and process changes resulted in a significantly increased proportion of ambulatory and inpatients screened annually and improved YNHHS's ability to identify unmet patient need. Critical success factors include leadership support and an organizational culture that prioritizes holistic and quality care. The updated process enabled all three hospitals surveyed by The Joint Commission to meet compliance standards. More research is needed to evaluate the impact unmet needs have on the health outcomes of YNHHS's unique patient populations and how these data can inform care delivery and management. Further, more guidance is needed to design, measure, monitor, and evaluate resource navigation and connectivity processes. The availability of resources, patient eligibility, and complexity of need will be important considerations

for health organizations seeking to identify and address HRSN.

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Nelly Angah, MHA, MPH, PMP, is Population Health Consultant, Department of Population Health and Clinical Integration, Yale New Haven Health (YNHH). **Bridget Meedzan, MPH**, is Population Health Analyst, Department of Population Health and Clinical Integration, YNHH. **Natacha Pruzinsky, MSHI**, is Population Health Specialist, Department of Population Health and Clinical Integration, YNHH. **Andrew O'Connell, MPH**, is Manager, Population Health Programs, Department of Population Health and Clinical Integration, YNHH. **Louis Hart, MD**, is Assistant Professor of Pediatrics (Hospital Medicine), Yale School of Medicine, and Medical Director, Office of Health Equity and Community Impact, YNHH. **Darcey Cobbs-Lomax, MBA, MPH**, is Executive Director, Office of Health Equity and Community Impact, YNHH. **Polly Vanderwoude, MHSA, FACHE**, is Executive Director, Department of Population Health and Clinical Integration, YNHH. Please address correspondence to Nelly Angah, nelly.angah@ynhh.org.

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