EvidenceNOW
BUILDING STATE CAPACITY
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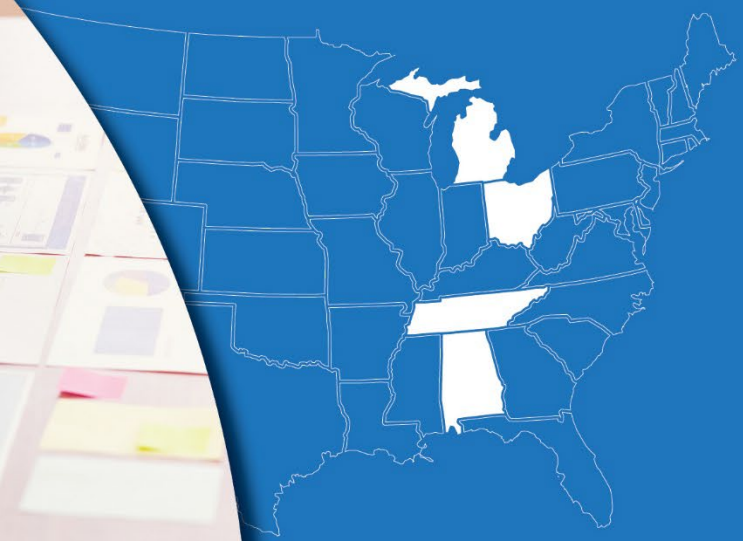
Agency for Healthcare Research and Quality

AHRQ EvidenceNOW: Building State Capacity

Technical Assistance to and Evaluation of Grant Initiative to Develop State-Level Capacity for Dissemination and Implementation of Patient-Centered Outcomes Research into Primary Care

Practice-Level Data Report
January 2025



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Practice-Level Data Report

AHRQ EvidenceNOW Technical Assistance (TA) to and Evaluation of Grant Initiative to Develop State-Level Capacity for Dissemination and Implementation of Patient-Centered Outcomes Research into Primary Care

Prepared For:
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Authors:
Robin Bloodworth, PhD
Jennifer Dolatshahi, MPA
Ellen Childs, PhD
Sean McClellan, PhD
Sarah J. Shoemaker-Hunt, PhD, PharmD

Abt Global
10 Fawcett Street, Cambridge, MA 02138

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Acronyms

ACC	Alabama Cardiovascular Cooperative
AHRQ	Agency for Healthcare Research and Quality
APHCA	Alabama Primary Health Care Association
CDC	Centers for Disease Control and Prevention
CEU	Continuing Education Unit
CME	Continuing Medical Education
CPCQ	Change Process Capacity Questionnaire
CVD	Cardiovascular Disease
EHR	Electronic Health Record
EvidenceNOW:BSC	EvidenceNOW: Building State Capacity
FQHC	Federally Qualified Health Center
HH4M	Healthy Hearts for Michigan
HHOI	Heart Healthy Ohio Initiative
HIE	Health Information Exchange
HIT	Health Information Technology
MCO	Managed Care Organization
MDE	Major Disruptive Event
MOC	Maintenance Of Certification
MUA	Medically Underserved Area
PF	Practice Facilitator
PHE	Public Health Emergency
QI	Quality Improvement
RUCA	Rural-Urban Commuting Area
SDOH	Social Determinants of Health
THHN	Tennessee Heart Health Network
VBP	Value-Based Purchasing

Executive Summary

Introduction

In 2021, the Agency for Healthcare Research and Quality (AHRQ) funded four grantees to develop sustainable, multi-organizational, state-level cooperatives and recruit at least 50 practices to participate in an evidence-based quality improvement (QI) project to improve heart health. The four grantees are located in Alabama, Michigan, Ohio, and Tennessee. This is part two of the final report of the mixed-methods evaluation of EvidenceNOW: Building State Capacity (EvidenceNOW:BSC). This report presents the findings on the impact of the grantees' QI support interventions on quality improvement capacity and care delivery.

Methods

We used a mixed-methods pre-post study design to examine the association between 1) practice-level characteristics (including practice structure, patient population, and other key factors), 2) the intensity of QI support strategies and 3) changes in care delivery (percent tobacco users receiving tobacco cessation intervention and percent hypertensive patients with adequate blood pressure control), and 4) practice-level QI capacity (Change Process Capacity Questionnaire [CPCQ] Index score).

To examine general data trends and correlations, we conducted descriptive analyses of all data, including frequency and percent for binary and categorical variables, and mean percent and standard deviation for continuous variables. We conducted bivariate analyses using paired samples t-tests to examine unadjusted changes in mean outcomes between baseline and post-intervention.

We then used multivariable linear regression to examine the effect of the intervention on changes in outcomes over time. Our models adjusted for a mix of explanatory (QI support strategies measured by categories of hours receiving active coaching and grantee fixed effects) and control measures (timepoint; practice characteristics, such as practice size, number of clinicians, ownership, specialty mix; practice population characteristics, such as percent Black population, percent Hispanic population, percent population aged 18-64: other internal factors, such as value-based purchasing [VBP] model participation and payer types, major disruptive events; and external factors, such as Rural-Urban Commuting Area (RUCA) codes, and Medically Underserved Area (MUA) designation). Our regression used a panel design, where our analytic sample for each model included only those practices with both baseline and post-intervention data. We clustered errors on practice ID to account for correlation within practices, and we performed pre- and post-model diagnostics to test for multicollinearity.

Findings

Descriptive Analyses

Practice Characteristics

Across grantees, the majority of practices had 2–5 clinicians (54%) and were single specialty practices (58%). Overall, nearly half were safety net practices (43%). Tennessee had more hospital/health-system owned practices (32%) than the other grantees. Nearly all practices had all electronic health records (EHRs) (93%); the most common EHR systems across all grantees were Epic (28%), eClinicalWorks (16%), and Athenahealth (14%); in Alabama, NextGen (32%) was also relatively common. Most practices were in urban areas (RUCA "urban core" category, 65%) and in areas with an MUA designation (69%).

Practice's Patient Population Characteristics

Overall, the majority of practice populations were White (63%), non-Hispanic (84%), aged 18-64 (63%). Patients were most commonly covered by private/commercial insurance (34%). This pattern in patient populations was largely consistent within each grantee, although practices in Alabama had about half White and half Black populations, and 22% were uninsured. Practices in Tennessee also had a higher proportion of their patients covered by Medicaid (23% + 12% dual eligible) than other grantees.

Intervention: QI Support for Practices

The amount of time practices received **active QI support** (e.g., in-person meetings, virtual visits, or telephone calls) from practice coaches or grantee team members ranged from an average of 304 minutes in Ohio to 440 minutes for Tennessee. The amount of **passive support** provided (e.g., emails, learning collaborative webinars) also varied, with passive support in Michigan making up approximately 37% of all minutes spent with practices and only 1.6% of minutes in Ohio.

Outcomes and Bivariate Analyses

At the post-intervention timepoint, the mean practice-level percentage of hypertensive patients with adequate blood pressure control across all grantees was 65%, ranging from 56% (Alabama and Tennessee) to 77% (Michigan). Michigan and Ohio had significant improvements in average rates of adequate blood pressure control between the pre-period and post-period timepoints in unadjusted bivariate models. The mean practice-level percentage of tobacco users receiving tobacco cessation counseling across all grantees was 62%, ranging from 12% (Tennessee, who measured this outcome differently than other sites[1]) to 78% (Michigan). Excluding Tennessee, the mean percent of tobacco users receiving tobacco cessation counseling was 75% (SE=2.1) and ranged from 72% (Alabama) to 78% (Michigan; these data not shown in results tables). The mean practice-level CPCQ Index score across all grantees was 14.99, ranging from 13.98 (Tennessee) to 17.36 (Michigan). All four grantees had significant improvements in mean CPCQ scores between the pre-period and post-period timepoints in unadjusted bivariate models.

Analyses of Changes in Outcome Measures – Regression Results

Tobacco Cessation

Regression models adjusting for explanatory and control variables showed that across grantees, the mean percentage of tobacco users who received tobacco cessation counseling was significantly higher, by 3.40 percentage points, in the post-intervention period compared to baseline (p=0.09), indicating a positive association between EvidenceNOW: BSC active QI support and tobacco cessation counseling, even when controlling for explanatory and control variables.

Participation in VBP models with different payer types was also associated with significantly higher mean tobacco cessation counseling. Specifically, practices participating in a VBP model with private/commercial payers had a mean percent tobacco cessation of 8.19 percentage points higher than practices participating in VBP models without private/commercial payers (p=0.01).

Factors associated with a lower percentage of smokers who received tobacco cessation counseling included Rural Area Commuting (RUCA) Codes, medically underserved area (MUA) designation, VBP model payer type, and total hours receiving active QI support. Specifically, practices located in suburban RUCA codes had 17.52 percentage points lower mean tobacco cessation counseling provided than practices located in urban core RUCAs (p=0.07); practices in medically underserved areas (MUAs) had 13.37 percentage points lower mean percent tobacco cessation counseling provided, compared to practices located in non-MUAs (p=0.00); practices participating in VBP models with Medicaid as a payer

[1] Note that TN did not measure the tobacco cessation outcome according to the recommended CMS guidelines, so we did not include TN in the subsequent regression models for this outcome.

had a mean percentage of smoker receiving tobacco cessation counseling that was 10.94 percentage points lower than practices participating in VBP models without Medicaid as a payer (p=0.01). Also, practices that engaged in >10 hours of active implementation activities had a mean percent tobacco cessation counseling of 35.06 percentage points lower than practices that engaged in <5 hours of active implementation activities (p<0.01).

Practice size, specialty mix, VBP model type "Other," VBP model payer type "Other," and percent practice population ages 18-64 were excluded from this model to preserve power, given the smaller sample size.

Blood Pressure Control

Mean percent hypertensive patients with adequate blood pressure control was significantly higher in the post-intervention period than at baseline, by 3.18 percentage points (p=0.00; See Exhibit 16), indicating a positive association between the active QI support provided in EvidenceNOW: BSC and blood pressure control when adjusting for explanatory and control variables.

Average rates of adequate blood pressure control varied across the grantees. Specifically, Michigan and Ohio practices had significantly higher mean percent blood pressure control than Alabama practices (14.2 and 11.74 percentage points higher, respectively; p<0.01), and Tennessee practices had a 9.3 percentage points lower percent mean blood pressure control than Alabama practices (p=0.01).

Factors associated with significantly lower mean percent blood pressure control include practice size, RUCA, population race, and population age. Specifically, practices with 11 or more clinicians had 6.96 percentage points lower percent blood pressure control than solo practices (p<0.10); practices located in rural RUCAs had 6.16 percentage points lower mean percent blood pressure control compared to practices located in urban core RUCAs (p=0.09); each one percentage point increase in practice Black population was associated with a 0.11 percentage point lower mean blood pressure control (p=0.01); and each one percentage point increase in practice population aged 18-64 was associated with a 0.24 percentage point lower mean blood pressure control (p=0.01).

Practice Capacity

Mean Change Process Capacity Questionnaire (CPCQ) Index Score was significantly higher by 4.79 points post-intervention, compared to baseline (p<0.01), indicating a positive association between EvidenceNOW: BSC QI support interventions and CPCQ index score after adjusting for explanatory and control variables.

Practice ownership and VBP model participation were also associated with a higher mean CPCQ index scores. Specifically, practices with safety net ownership had 6.39 point higher mean CPCQ index scores than clinician owned practices (p=0.04). Participation in a VBP model with a private/commercial payer was associated with a 5.16 points higher mean CPCQ index score versus participation in a VBP model without private/commercial payer (p<0.01).

VBP model payer type and major disruptive events were associated with a lower CPCQ score. Specifically, participating in a VBP model with Medicaid as a payer was associated with a 4.45 pointlower CPCQ index score, compared to participating in a VBP model without Medicaid as a payer (p=0.02). Practices with more than one major disruptive event had a 4.74 point lower CPCQ index score than practices that had no major disruptive events (p=0.04).

Conclusions

We offer the following conclusions and recommendations based on our findings:

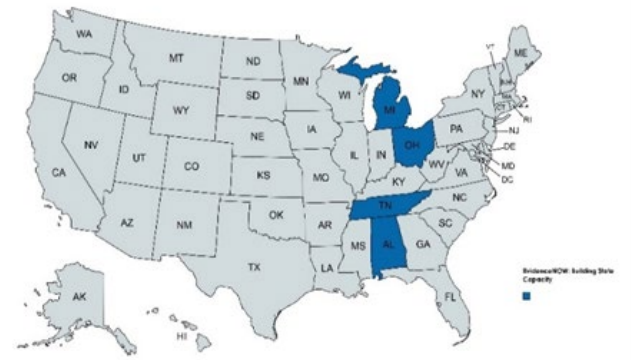
- **EvidenceNOW: BSC QI support was associated with improvements in clinical outcomes and practice capacity** even with the wide variation in the active QI support interventions provided to practices across grantees. EvidenceNOW: Advancing Heart Health similarly found improvements across their clinical outcomes and practice capacity.[2]
- **Practice ownership was not associated with either clinical outcome**, in contrast to findings in other EvidenceNOW initiatives.
- **Practice capacity was improved, especially for practices with safety net ownership.** Practice ownership was associated with mean CPCQ index score in regression models. Practices with safety net ownership had 6.39 points higher mean CPCQ index scores than clinician owned practices (p=0.04).
- **Value-based payment (VBP) was associated with higher mean tobacco cessation counseling and practice capacity.** Specifically, participation in a VBP model with a private/commercial payer was associated with a 4.92 point higher mean CPCQ index score versus participation in a VBP without private/commercial payer (p=0.05).
- **Major disruptive events in primary care were associated with lower practice capacity in our study, but not with worse clinical outcomes.**
- **Future QI initiatives may benefit from early harmonization and agreement on a minimum dataset and definitions, consistently captured in grantees' QI support interventions (e.g., dosage, mode, content).** Early in the evaluation, our team characterized each grantee's QI support strategies and planned interventions. We also sought information on how each grantee was going to capture their QI support intervention data; however, we were ultimately limited to the lowest, common data on interventions captured by each grantee, which was the date, mode of interaction, and minutes of interaction. We then classified to the extent we could what interactions would be considered active (i.e., in-person, virtual, telephone) and passive (i.e., email, learning collaborative session). Yet, even within this approach, there are likely some substantial differences in the nature of the active interactions. More comparable data points on the QI support interventions – with sufficient sample size – may allow for an evaluation of range of points variation in QI support approaches and any differential associations with outcomes.

[2] Advancing Heart Health. Content last reviewed March 2024. Agency for Healthcare Research and Quality, Rockville, MD. https://www.ahrq.gov/evidencenow/projects/heart-health/index.html

1. Introduction

To advance its mission, AHRQ issued a Request for Applications (RFA) entitled *Supporting Primary Care to Advance Cardiovascular Health in States with High Prevalence of Preventable CVD (cardiovascular disease) Events*.[3] AHRQ calls the resulting project "EvidenceNOW: Building State Capacity" (EvidenceNOW:BSC), advancing equity in heart health.[4]

In late 2020 to early 2021, AHRQ funded four grantees for this initiative to advance equity in heart health – one each from Alabama, Michigan, Ohio, and Tennessee. It charged grantees with building sustainable, state-level cooperatives including a network of primary care practices and enlisting at least 50 practices to participate in a quality improvement (QI) project to improve heart health.



- **Alabama Cardiovascular Cooperative (ACC)** was led by an academic institution in collaboration with another academic institution, a primary care association, and a QI organization from outside of Alabama. The ACC's guiding framework (Community-Academic Partnerships) called for equal partnership between academic researchers and community stakeholders. The practices the ACC recruited for its heart health QI project are part of federally qualified health center networks.
- **Healthy Hearts for Michigan (HH4M)** was led by a QI organization in collaboration with an academic partner leading the evaluation (with prior EvidenceNOW experience), as well as two other regionally distributed organizations to recruit practices and provide QI support.
- **Heart Healthy Ohio Initiative (HHOI)** was led by an academic institution with support from regional QI organizations and the state department of public health. HHOI built on Cardi-OH, a statewide collaborative to advance heart health. HHOI was rooted in the collective impact model and used a codesign process to engage stakeholders.
- **Tennessee Heart Health Network (THHN)** was led by an academic institution with support from a QI organization and other academic partners. THHN drew on best practices of the Agile Implementation Playbook to understand, predict, and steer behaviors of individuals and groups in project activities. THHN used an existing population health data network to recruit practices and provide data to practices for their QI projects. THHN implemented a range of interventions to improve the blood pressure control and tobacco cessation levels of heart health in small primary care practices to reduce/eliminate disparities in cardiovascular disease outcomes.

AHRQ awarded a contract to Abt Global LLC to provide technical assistance to grantees and conduct an independent evaluation of EvidenceNOW: BSC, evaluating the grantees' development of cooperatives, recruitment, and QI implementation. For the evaluation, Abt used a mixed-methods design collecting both primary and secondary data, including:

[3] Grants.gov. 2022, February 21. *AHRQ* - *Supporting Primary Care to Advance Cardiovascular Health in States with High Prevalence of Preventable CVD Events (U18)*.

[4] Agency for Healthcare Research and Quality. 2021, March. *EvidenceNOW: Building State Capacity*.

- Key informant interviews and member checking sessions with grant staff and cooperative members
- Administrative records (grant applications, grantee progress reports);
- Data on grantee needs and challenges from the Abt technical assistance team;[5] and
- Practice-level data reported by grantees.

This report presents our analysis of the impact across the four grantees of QI support on tobacco cessation counseling, blood pressure control, and practice capacity for change.

[5] The evaluation team used technical assistance meeting notes to shed light on grantee experiences and challenges.

2. Methods

We used a mixed-methods approach, drawing upon practice-level data and intervention data, to answer the question: "**How did QI support strategies affect QI capacity of practices and improve the delivery of care?"** Below, we describe the practice-level data and intervention data we collected. We then describe our analytic strategy for the descriptive analyses and regression analyses.

2.1. Data Sources

Exhibit 1 below provides an overview of the domains and variables our team had at the practice level.

2.1.1. Practice-Level Data

Each EvidenceNOW: BSC grantee provided our evaluation team their practice-level data collected via practice surveys, as well as the clinical outcomes measures which were collected from the EHRs through various means (e.g., health information exchange, data repository, pulled directly from the practice's EHR). Exhibit 1 provides the list of practice-level data that was requested of grantees by domain.

Exhibit 1. Practice-Level Data Provided by the EvidenceNOW: BSC Grantees

Domains	Measures and Variables
Structural practice characteristics[6]	• Ownership (clinician owned, hospital/health system, safety net [FQHC, rural HC, Indian HC, other federal], other [other, non-profit, academic]) • Size (solo, 2-5 clinicians, 6-10, 11-15, 16+) • Specialty mix (single, multi) • Staffing mix (type, number of full-time equivalent clinicians)
Other practice Factors	• Electronic health record (EHR – level of adoption and specific systems used) • Value-based purchasing (VBP) type (primary care transformation [e.g., patient-centered medical home], accountable care organization [ACO], episode-based payment model [e.g., Medicare Bundled Payments for Care Advanced (BPCI Advanced) model], other type) • Value-based purchasing payer involvement (Medicare, Medicaid, Private/Commercial, Other payer) • Major disruptive events
Patient population served	• Age (categorical) • Race • Ethnicity • Insurance coverage
External factors	• Health Resources and Services Administration (HRSA) Medically Underserved Area (MUA) status*. MUAs identify geographic areas with a lack of access to primary care services. • U.S. Department of Agriculture (USDA) Rural-Urban Commuting Area (RUCA) codes*. RUCA codes classify zip codes by measures of population density, urbanization, and daily commuting.

[6] Soylu, T. G., Cuellar, A. E., Goldberg, D. G., & Kuzel, A. J. (2020). Readiness and Implementation of Quality Improvement Strategies Among Small-and Medium-Sized Primary Care Practices: an Observational Study. *Journal of General Internal Medicine*, 1-7.

Domains	Measures and Variables
Intervention (QI Support Strategies)	• QI support strategies (e.g., practice facilitation) • Intervention period (e.g., 12 months) • Minutes of active coaching by practice facilitators (i.e., in-person, telephone, virtual) • Minutes of passive interaction (e.g., email)
Outcome measures	• **Change Process Capability Questionnaire (CPCQ)** measures practice capacity for improvement (14 questions, summed to an overall CPCQ Index score ranging from -28 to +28)[7] • **Blood Pressure Control** (NQF 008, CMS eMeasure 165): Percentage of patients aged 18 through 85 years of age who had a diagnosis of hypertension (HTN) and whose blood pressure (BP) was adequately controlled (<140/90) during the measurement year. • **Tobacco Use**: Screening and Cessation Intervention (NQF 0028, CMS eMeasure ID 138): Percentage of patients aged 18 years and older who were screened for tobacco use one or more times within 24 months AND who received cessation counseling intervention if identified as a tobacco user.

Notes: *Inferred from ZIP Code.

Grantees reported practice-level measures at baseline and again at the end of the intervention. The timing of baseline data collection varied across each grantee (see Exhibit 2). All grantees initially intended to implement a stepped wedge study design, but because of recruitment challenges[8,9] only Ohio and Tennessee successfully randomized all practices into waves before the practice facilitation began.[10] Grantees were encouraged to also assess outcomes 3-6 months after the intervention ended to assess sustainability; however, not all grantees were able to capture data at these time points from practices; thus we only included immediately post-intervention data across grantees in the outcomes analyses.

2.1.2. Grantee Samples and Data Summary

Grantees collected data from practices at baseline and follow up. Collected data included practice characteristics, such as value-based purchasing (VBP) model participation and payer types, practice population characteristics; and outcomes of interest, such as percent of hypertensive patients under adequate blood pressure control, percent of tobacco users who received tobacco cessation counseling, and CPCQ index scores. We supplemented these practice data with data relating to community factors, including Rural-Urban Commuting Area (RUCA) codes, and Medically Underserved Area (MUA) designation using practice ZIP code as a proxy for service area. Exhibit 2 shows the baseline and intervention period for each grantee, as well as what data were collected at baseline (pre-intervention) and post-intervention. Note that only AL collected all suggested data related to explanatory factors and control variables post-intervention. MI and OH did not collect all practice and population characteristics post-intervention, and TN did not collect any practice or population characteristics post-intervention. For

[7] Solberg LI, Asche SE, Margolis KL, Whitebird RR. Measuring an organization's ability to manage change: the change process capability questionnaire and its use for improving depression care. American Journal of Medical Quality. 2008 May;23(3):193-200.

[8] See the Interim Evaluation Report I, section 3.2 for recruitment strategies; and 3.3.2 for reasons for non-participation. Also see the Interim Evaluation Report II, section 3.2 on strategies for recruiting and retaining practices.

[9] McHugh, M., Heinrich, J., Philbin, S., Bishop, D., Smith, J. D., Knapke, J. M., ... & Walunas, T. L. (2023). Declining Participation in Primary Care Quality Improvement Research: A Qualitative Study. *The Annals of Family Medicine*, *21*(5), 388-394.

[10] For information about Michigan's design, see: Krefman, A. E., Ciolino, J. D., Kan, A. K., Maki, B., McHugh, M., Smith, J. D., & Walunas, T. L. (2023). Rationale and design for Healthy Hearts for Michigan (HH4M): A pragmatic single-arm hybrid effectiveness-implementation study. *Contemporary Clinical Trials Communications*, *35*, 101199.

these practices, we used baseline data in the descriptive statistics and analyses, and specific data duplicated from baseline is noted in each descriptive table below in sections 3.2.1 and 3.2.2. Conversely, if any practices were missing data for explanatory and/or control variables at baseline but had said missing data at follow-up, we used follow-up data to impute baseline data. We did not impute data for any missing outcomes.

Exhibit 2: Baseline and Post-intervention time periods and data collected by grantee.

	Alabama	Michigan	Ohio	Tennessee
Baseline Period	**Jan 2021-Sept 2022**	**Jan 2021-Dec 2021**	**Nov 2021-July 2022**	**Aug 2021-July 2022**
Intervention Period	**July 2021-Dec 2023**	**Jan 2022-Jan 2024**	**May 2022-Aug 2023**	**Nov 2021-Aug 2023**
Practice Characteristics				
Practice size	Baseline & F/U	Baseline only	Baseline & F/U	Baseline only
Ownership	Baseline & F/U	Baseline & F/U	Baseline only	Baseline only
Specialty mix	Baseline & F/U	Baseline & F/U	Baseline only	Baseline only
EHR adoption	Baseline & F/U	Baseline & F/U	Baseline & F/U	Baseline only
EHR type	Baseline & F/U	Baseline only	Baseline & F/U	Baseline only
Staffing	Baseline & F/U	Baseline & F/U	Baseline & F/U	Baseline only
VBP participation & payer	Baseline & F/U	Baseline & F/U	Baseline & F/U	Baseline only
Major disruptive events	Baseline & F/U	Baseline only	Baseline & F/U	Baseline only
Population Characteristics				
Age	Baseline & F/U	Baseline & F/U	Baseline & F/U	Baseline only
Race	Baseline & F/U	Baseline only	Baseline & F/U	Baseline only
Ethnicity	Baseline & F/U	Baseline only	Baseline & F/U	Baseline only
Insurance Coverage	Baseline & F/U	Baseline only	Baseline & F/U	Baseline only
Outcomes				
CPCQ	Baseline & F/U	Baseline & F/U	Baseline & F/U	Baseline & F/U
Tobacco cessation	Baseline & F/U	Baseline & F/U	Baseline & F/U	Baseline & F/U
Blood pressure control	Baseline & F/U	Baseline & F/U	Baseline & F/U	Baseline & F/U

2.1.3. Intervention (QI Support) Data

The grantees provided QI support to primary care practices to implement evidence-based interventions or clinical innovations that have been shown to improve heart health, such as accurately measuring blood pressure. These QI support strategies are the "methods or techniques used by practice change support agents to motivate, guide and support practices in adopting, implementing and sustaining evidence-based changes and QIs."[11] QI support strategies can also be thought of as implementation strategies.[12]

The QI support strategies provided by the grantees included: practice facilitation; health IT support; data, feedback, and benchmarking; education and training; shared learning; and incentives (see Appendix A or the Interim Evaluation Report II for more details on grantees' planned QI support strategies and interventions). Initially, we intended to examine time spent on each of the QI support strategies (and the resultant outcomes from those activities). Ultimately, however, we decided to categorize the QI support

[11] Solberg, L. I., Kuzel, A., Parchman, M. L., Shelley, D. R., Dickinson, W. P., Walunas, T. L.,... & Nagykaldi, Z. (2021). A taxonomy for external support for practice transformation. The Journal of the American Board of Family Medicine, 34(1), 32-39.

[12] Perry, C. K., Damschroder, L. J., Hemler, J. R., Woodson, T. T., Ono, S. S., & Cohen, D. J. (2019). Specifying and comparing implementation strategies across seven large implementation interventions: a practical application of theory. Implementation Science, 14(1), 1-13.

data into active and passive QI support, for two reasons. First, the nature of the data made it difficult, if not impossible, to develop QI support constructs that would be comparable across grantees. This is because grantees collected and submitted their QI support strategies with varying amounts of specifics/details, precluding our ability to standardize these data across both discreet categories (e.g., health IT support, education, and training) and grantees. Second, we had limited power to detect effects, given the small sample size. Therefore, we decided that the relative dose of "active" QI support was most aligned to the aim of the EvidenceNOW: BSC grants to improve practice capacity and clinical outcomes.

To operationalize the intervention "dose" and harmonize across grantees we examined the practice facilitation documentation each grantee collected to measure their intervention "dose" each practice received. The details of this documentation varied considerably across grantees, but consistently included the date of each interaction with the practices, the mode of interaction (e.g., in-person, e-mail) and the number of minutes spent in each interaction with the practice. Grantees' data regarding the "dose" of the QI support strategies were filtered to select only interactions that took place during the designated intervention periods to ensure no contacts outside of the window were included. The documentation on the content or focus of interactions was also captured across grantees (e.g., practice workflow, health IT support) and reflected the aims of each grantees' interventions (e.g., the "menu" or range of interventions offered such as blood pressure measurement, self-management support, team-based care). For most of the grantees the documentation was a categorical set of options, except for one grantee that had a free-text field. Thus, where possible, we reviewed these additional details provided to ensure that only interactions that were associated with delivering QI support were included (and not interactions related to collecting data for the study, for example). See Appendix A for examples of the type of content or topics each grantee had for practice facilitation.

For measuring *dosage* of QI support we used the mode of interaction to classify interactions as being passive (e.g., e-mail exchanges) or active (e.g., virtual or in-person meetings or site visits, phone calls) (e.g., practices in Tennessee could participate in learning collaborative sessions related to specific QI topics; however, due to the nature of these sessions, practices attendance at these sessions were classified as passive interactions). We calculated a summary number for each practice based on:

1) the total number of minutes receiving ***active*** QI support,

2) the number of minutes receiving ***passive*** interactions, and

3) the ***total*** number of minutes receiving any interaction or QI support

The final variable representing QI support used in regression models categorized total number of active minutes into categories of number of hours spent engaged in active QI support: 1) <5 hours, 2) 5-10 hours, 3) >10 hours. We chose this method to align with the methodologies used to evaluate EvidenceNOW: Advancing Heart Health.[13] The number of months each practice received support was also calculated in two ways: *months of support* is the number of months the practice was interacting with the practice facilitators from the first interaction (passive or active) to the last active interaction. *Intervention period (months)* was calculated based on the intervention data range that grantees reported for each practice in their outcome data.

2.2. Analytic Methods

To assess changes in outcomes over time associated with grantees' QI initiatives, we conducted quantitative analyses of practice-level data submitted by the grantees. Conducting analyses at the practice

[13] Cohen DJ, Sweeney SM, Miller WL, Hall JD, Miech EJ, Springer RJ, Balasubramanian BA, Damschroder L, Marino M. Improving Smoking and Blood Pressure Outcomes: The Interplay Between Operational Changes and Local Context. Ann Fam Med. 2021 May-Jun;19(3):240-248. doi: 10.1370/afm.2668. PMID: 34180844; PMCID: PMC8118489.

level, combined across all grantees, allowed us to include a variety of practice characteristics and contextual factors in our analyses, and informed our understanding of the generalizability of the findings. The section below describes the design of our analyses.

2.2.1. Descriptive Analyses

We calculated descriptive statistics for measures at baseline and post-intervention. For binary and categorical measures, we calculated counts and percentages; for continuous measures, we calculated means and standard deviations. For practices with measures that deviated substantially from measures of central tendency, we reviewed source data to confirm the accuracy of the data.

We also calculated descriptive statistics for changes over time in key outcome measures (i.e., mean practice level: CPCQ Index score, percent hypertensive patients with adequate blood pressure control, and percent tobacco receiving tobacco cessation counseling) to measure how participating practices' outcomes changed over the course of the initiative. To assess whether there were any preliminary differences in outcomes between the baseline and post-intervention period, we conducted bivariate analyses of each outcome using paired t-tests. This method allowed us to determine whether average changes over time between baseline and post-intervention outcome measures were statistically significant, without adjusting for other factors. We did not conduct bivariate analyses for practice-level measures where changes due to the intervention were not hypothesized (e.g., structural and population characteristics characteristics).

2.2.2. Analysis of Changes in Outcome Measures Over Time

We used an intervention-only pre-post study design with practices that received the intervention to assess the association of QI support with changes over time (i.e., baseline compared to the end of the intervention) for three mean practice-level outcomes of interest: CPCQ Index, blood pressure control, and tobacco cessation. This analysis did not include a comparison group. We used multivariable linear regression to assess changes over time in outcomes associated with QI support, controlling for measures of practice characteristics and other internal and external factors related to practice readiness for change and clinical outcomes. We limited all analyses to practices with data in both time periods for all outcome, explanatory, and control measures (i.e., a panel data design). To control for repeated measures within each practice, our panel design included practice-level random effects, and standard errors were clustered at the practice level. To assess average differences in outcomes across grantees, we included an indicator for each grantee (i.e., grantee fixed effects). We assessed for collinearity to ensure estimates were not biased by highly correlated explanatory and/or control variables. Outcome-specific analyses are described below.

Association of Initiative with Change in Change Process Capability Questionnaire (CPCQ) Index Score

This analysis assessed factors associated with the mean practice-level CPCQ Index score. The regression model was specified as follows:

- *Outcome measure*: Practice-level CPCQ Index score (i.e., continuous variable, ranging from -28 to 28, with higher scores indicating higher levels of change process capacity);
- *Explanatory measures:* total hours of active QI support practice received (categorized into <5, 5-10, and >10 hours) and grantee fixed effects;
- *Control measures*: measures of practice characteristics (timepoint, practice size, number of clinicians, ownership, specialty mix, percent Black population, percent Hispanic ethnicity, percent population aged 18-64), other internal factors (value-based purchasing model participation and payer types, major disruptive events), and external factors (RUCA codes, MUA designation).

Association of Initiative with Change in Blood Pressure Control

This analysis assessed factors associated with mean practice-level blood pressure control, using the percent of hypertensive patients with adequate blood pressure control serving as the dependent variable in a distinct regression model. Regression was specified as follows:

- *Outcome measures*: practice-level percent of hypertensive patients with adequate blood pressure control (continuous variables, ranging from 0-100);
- *Explanatory measures:* total hours of active QI support practice received (categorized into <5, 5-10, and >10 hours) and grantee fixed effects;
- *Control measures*: measures of practice characteristics (e.g., practice size, number of clinicians, ownership, specialty mix, percent Black population, percent Hispanic ethnicity, percent population aged 18-64), other internal factors (e.g., value-based purchasing model participation and payer types, major disruptive events, baseline CPCQ Index score), and external factors (e.g., RUCA codes, MUA designation).

Association of Initiative with Change in Tobacco Cessation Counseling

This analysis assessed factors associated with the mean practice-level tobacco cessation interventions, with the percent of tobacco users receiving tobacco cessation counseling serving as the dependent variable in a distinct regression model. Note that Tennessee did not measure their tobacco cessation outcome in the same way as other grantees, resulting in an outcome of 0% for nearly all practices. For this reason, we excluded Tennessee practices from regression-adjusted analyses assessing changes in tobacco cessation. We chose variables for exclusion that were not significantly associated with tobacco control in the full regression model, or in independent bivariate models. The main regression for this analysis was specified as follows:

- *Outcome measures*: practice-level percent of tobacco users receiving a tobacco cessation intervention (continuous variables, ranging from 0-100);
- *Explanatory measures:* total hours of active QI support practice received (categorized into <5, 5-10, and >10 hours) and grantee fixed effects;
- *Control measures*: measures of practice characteristics (number of clinicians, ownership, percent Black population, percent Hispanic ethnicity), other internal factors (value-based payment model participation and payer types [excluding VBP Other participation type participation and VBP Other payer type], major disruptive events, baseline CPCQ Index score), and external factors (RUCA Codes, MUA designation).[14]

Sensitivity Analyses and Further Explorations

We conducted several explorations and/or sensitivity analyses to specify the most appropriate model and support our findings.

- *Practice coaches fixed effects*: We considered adding practice coach/practice facilitator fixed effects to the model to control for any variation in active QI support across different coaches within a grantee. However, our pre- and post-diagnostic tests indicated high levels of multicollinearity, so we decided to use only grantee fixed effects.

[14] The exclusion of Tennessee reduced the sample size relative to the model specification; to the ability to detect statistically significant differences for key explanatory measures in the risk-adjusted analysis, we excluded the following control measures: practice size, specialty mix, VBP other participation type, VBP other payer type, and percent population ages 18-64.

- *Examining changes in ownership:* In addition to examining practice-level information about major disruptive events, we were also curious whether change in ownership could affect our outcomes. Of the practices that submitted ownership data at both baseline and post-intervention time periods, only 4 practices had a change in ownership data, and they were all in Alabama. Therefore, we did not further pursue this analysis.

- *Examining changes in clinical outcome denominator:* We examined changes in tobacco cessation and blood pressure control denominators to assess whether any findings could be explained by an improvement in documentation, rather than an improvement in outcomes. Our findings were mixed, so we did not pursue this further.

- *Examining the effects of specific major disruptive events*: As an additional sensitivity analysis, we examined models containing indicators for individual major disruptive events (versus a categorial variable indicating none, one, and more than one major disruptive event). Results were mostly comparable for tobacco cessation and CPCQ Index score, but blood pressure control was no longer significantly different between baseline and post-intervention. However, adding several major disruptive event covariates 1) increased the number of observations necessary for adequate power to detect effect sizes, and 2) decreased our sample size due to missingness in the new covariates to a point where our models were no longer adequately powered.

- *Recoding ownership categories to emphasize federal support*: Our current categorization of ownership includes all federal ownership categories and rural health in a combined "safety net" category. We pulled out rural health to see if that changed the results. However, for most grantees, there were very few rural health practices, so we kept rural practices included in the safety net category.

- *Examining models with total active implementation minutes instead of categorical active hours:* We examined models replacing active hours categories with total active minutes as a sensitivity analysis to assess whether the inclusion of passive minutes in the model has an effect. Changes in main effects were negligible, and explanatory/control variables were mostly unchanged in terms of direction and significance of effects, with a few exceptions. See results section for more details.

- *Examining models with total implementation minutes:* We examined models replacing active categorical hours with total minutes as a sensitivity analysis to assess whether the inclusion of passive minutes in the model has an effect. Changes in main effects were negligible. *Examining models with counts of interactions, versus categorical active hours:* Scatter plots examining counts of interactions versus months of intervention coaching look similar to those using intervention minutes versus months of intervention coaching, except there are more passive interactions than active interactions, whereas there were more active minutes versus passive minutes. The effects on the models are not changed in terms of timepoint or active intervention. See the results section for more details.

- *Examining models with an emphasis on disparities:* All of our models control for practice-level percent population Black race and Hispanic ethnicity. The practices collected these data as percentages ranging from 0-100, and we preserved this format in the main models to preserve power (i.e., not adding additional variables/degrees of freedom). However, the interpretation of the model coefficients in this format – every one percentage point increase in practice Black population is associated with X percentage point increase in outcome – is not very meaningful/helpful in terms of examining disparities in the potential effects of the EvidenceNOW interventions. To assess more meaningful impacts on disparities, we constructed conducted disparities focused sensitivity tests in two ways, by adding 1) an interaction term between timepoint and percent Black population, 2) a model examining the clinical outcomes by race, and 3) a categorical variable of percent Black

population, using quartiles. See the results section for more details. See results section for detailed information on results using these models.

- *Examine the post-intervention "maintenance" period data:* Although not required, practices were encouraged to collect data in a maintenance period after the post-intervention time period to assess continued effects. However, only one grantee collected maintenance data, and the data had high levels of missing values, so we decided not to pursue these analyses further.

3. Findings

3.1. Descriptive Analyses

3.1.1. Practice Characteristics

Exhibit 4 shows the prevalence of enrolled practices' characteristics for each grantee and in total across grantees. Across grantees, the most common enrolled practice size was 2–5 clinicians (54%), more than half were single specialty practices (58%), and 43% were safety net practices. Tennessee had the largest proportion of hospital/health-system owned practices (32%) and Michigan had the largest proportion of safety net practices (62%). The most common EHR systems across all grantees were Epic (28%), eClinicalWorks (16%), and Athenahealth (14%); in Alabama, NextGen (32%) was the most common. Nearly two-thirds of practices were in urban areas (RUCA "urban core" category, 65%). More than two-thirds of practices were in areas with an MUA designation (69%).

Exhibit 4. Practice Characteristics at Baseline

	Alabama (N=50)		Michigan (N=50)		Ohio (N=53)		Tennessee (N=62)		Total (N=215)	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Ownership or Practice Type										
Clinician owned	13	26.00	5	10.00	1	1.90	18	29.00	37	17.20
Hospital/health system	3	6.00	4	8.00	18	34.00	20	32.30	45	20.90
Safety net	28	56.00	31	62.00	22	41.50	12	19.40	93	43.30
Other	2	4.00	8	16.00	10	18.90	12	19.40	32	14.90
Practice Size										
Solo practice	11	22.00	4	8.00	0	0.00	11	17.70	26	12.10
2-5 clinicians	29	58.00	38	76.00	22	41.50	27	43.50	116	54.00
6-10 clinicians	2	4.00	3	6.00	13	24.50	14	22.60	32	14.90
11-15 clinicians	2	4.00	3	6.00	4	7.50	10	16.10	19	8.80
16 or more clinicians	2	4.00	0	0.00	7	13.20	0	0.00	9	4.20
Specialty Mix										
Single-Specialty	28	56.00	35	70.00	28	52.80	33	53.20	124	57.70
Multi-Specialty	18	36.00	13	26.00	23	43.40	29	46.80	83	38.60
Has EHR										
Yes, all electronic	43	86.00	48	96.00	46	86.80	62	100.00	199	92.60
Yes, part paper and part electronic	3	6.00	0	0.00	0	0.00	0	0.00	3	1.40
EHR Name[1]										
EPIC	0	0.00	13	26.00	28	52.80	20	32.30	61	28.40
eClinicalWorks	0	0.00	18	36.00	2	3.80	14	22.60	34	15.80
Athenahealth	11	22.00	9	18.00	6	11.30	4	6.50	30	14.00
Other, Please specify	6	12.00	1	2.00	10	18.90	12	19.40	29	13.50
NextGen	16	32.00	0	0.00	0	0.00	1	1.60	17	7.90
Cerner	4	8.00	2	4.00	0	0.00	4	6.50	10	4.70
Greenway Medical	6	12.00	1	2.00	0	0.00	0	0.00	7	3.30
Allscripts	1	2.00	0	0.00	0	0.00	5	8.10	6	2.80
Practice Fusion	2	4.00	1	2.00	0	0.00	2	3.20	5	2.30
e-MDs	0	0.00	1	2.00	0	0.00	0	0.00	1	0.50

(Table continued below)

	Alabama (N=50)		Michigan (N=50)		Ohio (N=53)		Tennessee (N=62)		Total (N=215)	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Rural-Urban Commuting Area Codes (RUCA)										
Large Town	3	6.00	5	10.00	4	7.50	6	9.70	18	8.40
Rural Area	7	14.00	10	20.00	0	0.00	0	0.00	17	7.90
Suburban	5	10.00	11	22.00	1	1.90	5	8.10	22	10.20
Urban Core	25	50.00	21	42.00	46	86.80	48	77.40	140	65.10
Medically Underserved Area Designation (MUA)										
Yes	32	64.00	29	58.00	44	83.00	43	69.40	148	68.80

Source: Grantee-reported practice-level data (2021-2023).

Notes: [1]Other EHR systems not used by any practices are AdvancedMD, Amazing Charts, Care360, CE/Gentricity, McKession/Practice Partner, Sage/Vitera, and SOAPware

Exhibit 5 presents summary statistics for practice staffing characteristics by grantee and overall. Across all grantees, enrolled practices had an average of 7.6 clinicians, ranging from 5.8 in Alabama to 7.8 in Tennessee. The overall mean total number of clinical support staff was 9.4, ranging from 7.4 in Michigan to 11.2 in Tennessee. Across all grantees, a minority of practices had pharmacists (31.6%) or psychologists (16.7%). Overall, the average clinician full time effort (FTE) was 4.65 (ranging from 0.84–6.56), and the average clinical support staff FTE was 9.76 (ranging from 0.14–15.55). These numbers are likely smaller than the total number of clinicians because not all clinicians work full time.

Exhibit 5. Practice Staffing Characteristics at Baseline

	Alabama (n=50)		Michigan (n=50)		Ohio (n=53)		Tennessee (n=62)		Total (N=215)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Clinicians Total N	5.78	20.22	5.92	6.36	10.70	14.18	7.81	9.32	7.55	13.27
Clinicians FTEs	3.59	7.78	0.84	0.23	6.03	5.98	6.56	18.02	4.65	11.53
Clinical Support Total N	8.91	17.01	7.44	6.72	9.63	7.10	11.15	11.85	9.41	11.46
Clinical Support FTEs	8.91	17.18	0.92	0.14	9.15	7.12	15.55	33.11	9.76	21.67
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Has Pharmacist	4	8.00	9	18.00	32	60.40	23	37.10	68	31.60
Has Psychologist	2	4.00	11	22.00	11	20.80	12	19.40	36	16.70

3.1.2. Practices' Patient Population Characteristics

Overall, the majority of practice populations were White (63%), non-Hispanic (84%), and aged 18-64 (63%). On average, 34% of patients served by each practice were covered by private/commercial insurance. These trends were similar across grantees, with a few exceptions. Practices in Alabama had about half White and half Black populations, and 22% were uninsured. Practices in Tennessee had more patients covered by Medicaid (23% + 12% dual eligible) than other grantees.

Exhibit 6. Practices' Patient Population Characteristics for the EvidenceNOW:BSC Practices at Baseline

	Alabama (n=50)		Michigan (n=50)		Ohio (n=53)		Tennessee (n=62)		Total (n=215)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age Categories Percent										
0–17	10.87	9.83	15.12	10.92	0.49	1.33	9.95	11.10	8.90	10.62
18–64	67.90	16.64	58.93	10.33	70.32	17.94	55.92	17.39	62.80	17.05
65–74	17.24	15.04	14.81	6.50	17.51	8.80	22.43	12.68	18.31	11.46
75+	4.21	4.50	11.14	9.58	11.62	9.59	11.71	8.87	10.02	9.00
Race Percent										
American Indian/Alaska Native	0.54	1.56	0.00	0.00	0.28	0.19	0.19	0.39	0.32	0.87
Asian	1.90	4.42	1.22	4.09	1.89	2.79	0.89	1.58	1.48	3.27
Black	46.85	25.65	13.24	22.22	20.49	20.74	22.23	26.20	25.58	26.49
Native Hawaiian/Pacific Islander	0.62	0.90	0.15	0.37	0.17	0.19	0.14	0.40	0.26	0.55
White	45.12	25.48	77.45	26.41	68.89	24.16	62.46	34.79	63.32	30.16
Other	1.09	1.76	1.99	2.82	1.66	2.32	6.75	14.27	3.04	8.14
Unknown	3.50	4.77	5.40	5.82	6.62	13.97	7.33	19.72	5.87	13.38
Ethnicity Percent										
Hispanic	6.49	9.58	12.13	21.79	3.86	7.32	10.90	17.71	8.05	14.94
Non-Hispanic	86.94	15.82	80.91	26.29	88.77	14.58	78.15	27.37	83.79	21.90
Unknown	5.44	11.72	6.96	8.84	7.37	13.72	10.95	23.91	7.91	16.42
Insurance Coverage Percent										
Medicare Only	15.53	15.18	19.88	15.25	23.03	12.07	23.22	15.93	20.78	14.84
Medicaid Only	21.75	11.25	27.81	20.03	17.23	16.15	22.82	15.99	22.23	16.54
Dual Eligible	6.86	7.60	6.80	11.56	0.00	0.00	11.81	11.61	8.79	10.80
Private/Commercial	31.46	20.13	36.87	19.33	39.88	22.15	27.58	16.75	33.88	20.10
No Insurance	22.10	17.69	5.43	7.05	15.18	20.65	13.48	18.48	13.94	17.87
Other	2.30	4.30	3.34	14.29	3.63	10.63	1.09	3.36	2.48	9.10

Source: Grantee-reported practice-level data (2021-2023).

3.1.3. Intervention: QI Support for Practices

As shown in Exhibit 7, the average total minutes of support—whether active or passive support—varied substantially between grantees (ranging from 309 minutes for Ohio to 1,479 minutes for Tennessee). The amount of **passive support** provided (e.g., emails, learning collaborative webinars) also varied greatly, with passive support in Michigan making up approximately 37% of all minutes spent with practices and only 1.6% of minutes in Ohio. Tennessee provided both the longest average period of coaching (15.5 months of support), and the highest average in minutes spent providing total support, largely driven by the average number of minutes spent in passive coaching of practices (1039 minutes, and 70% of total support). The amount of time practices received **active QI support** (e.g., in-person meetings, virtual visits, or telephone calls) from practice coaches or grantee team members ranged from an average of 304 minutes in Ohio to 440 minutes for Tennessee.

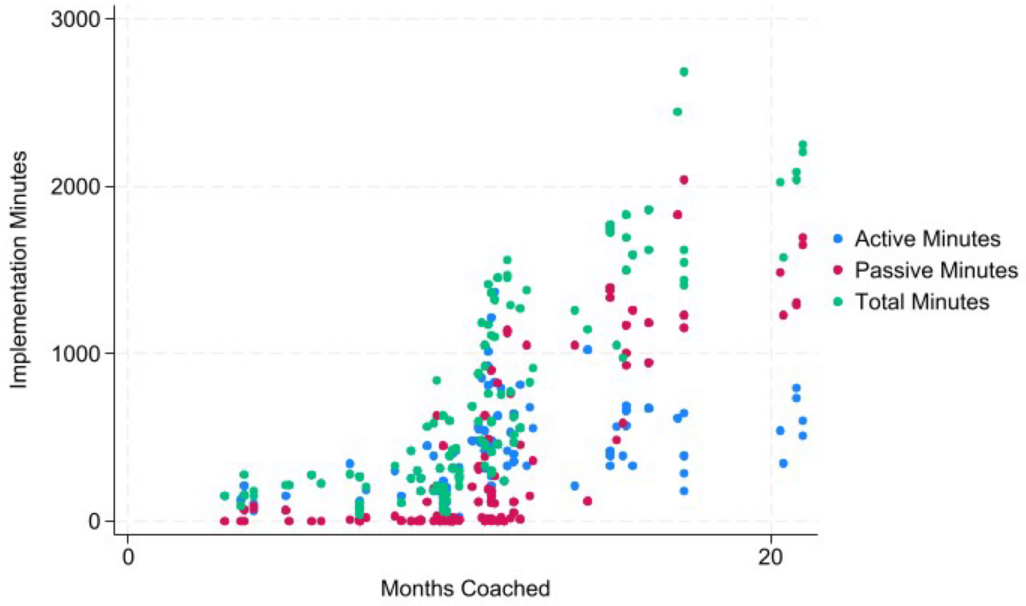
Exhibit 7. Support Provided to Practices by Grantee

	Alabama (N = 44)		Michigan (N = 49)		Ohio (N = 50)		Tennessee (N = 42)	
	7/15/2021–12/31/2023		1/20/2022–1/25/2024		5/1/2022–8/1/2023		11/1/2021–8/1/2023	
	Mean (SD)	Median	Mean (SD)	Median	Mean (SD)	Median	Mean (SD)	Median
Minutes of active* QI support	426.20 (408.55)	221.20	452.76 (211.24)	450.0	304 (125.34)	297.5	439.64 (174.82)	390.0
Minutes of passive* support	49.40 (56.68)	31.50	265.39 (185.45)	180.0	5.1 (11.89)	0.0	1038.93 (441.03)	1140.0
Total minutes of support (active or passive)	453.38 (438.32)	233.75	718.14 (314.55)	684.0	309.1 (123.95)	297.5	1478.57 (534.71)	1522.5
Months of support**	9.66 (1.87)	9.9	10.8 (2.35)	11.1	9.02 (2.75)	10.0	14.9 (4.12)	15.5
Intervention period (months)***	12.52 (3.88)	11.3	12.47 (1.59)	12.1	12 (0)	12.0	16.69 (3.44)	18.0

*QI support was classified as active or passive based on the mode or nature of the interaction. Active support included: in-person meetings, virtual visits, or telephone calls. All other interactions were deemed passive, including email, learning collaboratives, etc.
**Months of support coached is the number of months the practice was interacting with the practice facilitators from the first interaction (passive or active) to the last active interaction.
***Intervention period (months) was calculated based on the reported intervention data range that grantees reported for each site in their outcome evaluation data.

When comparing months of support with total minutes of support, longer intervention periods were associated with a higher number of active, passive, and total minutes spent on implementation activities, as expected (Exhibit 8). Intervention periods that lasted less than 12 months had higher levels of active QI support in minutes, and interventions lasting longer than 12 months tended to have higher levels of passive support minutes.

Exhibit 8. Distribution of active, passive, and total minutes of support across months coached for all grantees in the intervention period.

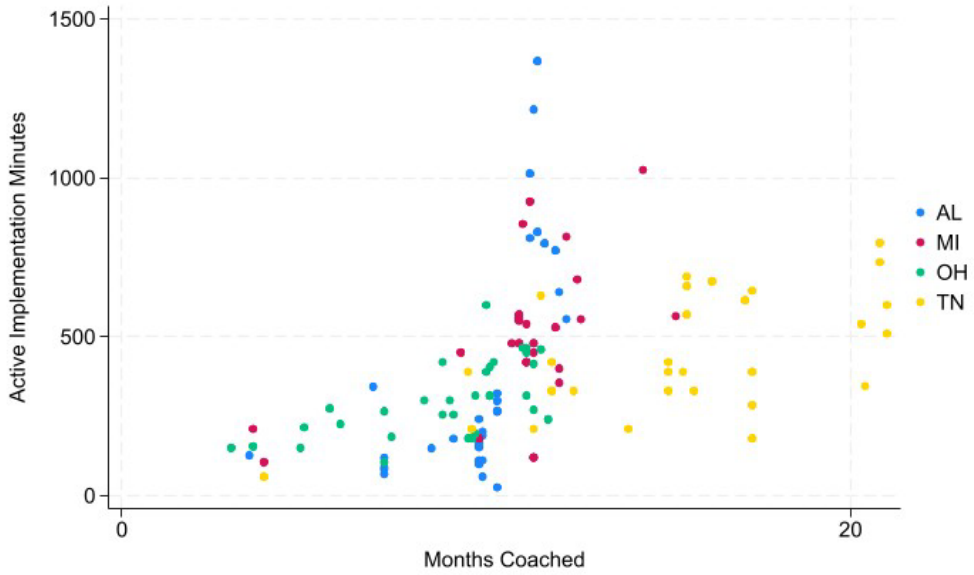


Source: Grantee-reported practice-level data (2021-2023).

When comparing intervention months and minutes of active QI support separately by grantee, although the same generally linear trend persists, a longer intervention period does not necessarily mean higher

active minutes (Exhibit 9). Ohio and Tennessee show a steadier, more linear increase in active minutes versus months coached. Alabama and Michigan both show a gradual increase in active minutes through the 12-month mark, and then there is a sharp increase in active minutes. We can also see that Tennessee had the longest intervention periods, whereas the other grantees intervention periods ended around 12 months.

Exhibit 9. Distribution of active implementation minutes across months coached by grantee in the intervention period.



Source: Grantee-reported practice-level data (2021-2023).

3.1.4. Outcomes and Bivariate Analyses

On average, all three practice-level outcome measures–blood pressure control, tobacco cessation, and CPCQ index–improved following the EvidenceNOW: BSC QI support intervention. In bivariate analyses, where mean outcomes were compared pre- and post-intervention without adjusting for other explanatory or control variables, mean percent hypertensive population with adequate blood pressure control was 3.16 percentage points higher in the post-intervention period than in the pre-intervention period ($p<0.01$) (Exhibit 10). Additionally, mean percent tobacco users receiving tobacco cessation counseling increased by 2.69 percentage points in the post-intervention period ($p<0.05$), and mean CPCQ Index scores increased by 5.42 points in the post-intervention ($p<0.01$).

On average across all grantees in the post-intervention period, the mean practice-level percent hypertensive patients with adequate blood pressure control was 65%, ranging from 56% (Alabama and Tennessee) to 77% (Michigan). Two of the four grantees had significant improvements. Mean practice-level percent tobacco users receiving tobacco cessation counseling across all grantees was 62%, ranging from 12% (Tennessee[15]) to 78% (Michigan). The mean practice-level CPCQ Index score across all sites was 14.99, ranging from 13.98 (Tennessee) to 17.36 (Michigan) with significant improvements for each of the four grantees.

[15] Note that TN did not measure the tobacco cessation outcome according to the recommended CMS guidelines, so we did not include TN in the subsequent regression models for this outcome.

Exhibit 10: Descriptive statistics and bivariate paired t-test results comparing baseline to post-intervention outcome measures

		Blood Pressure Control	Tobacco Cessation	CPCQ Index
		Percent of Hypertensive Patients Under Adequate Blood Pressure Control	Percent of smokers that received counseling	Aggregate score across 14 CPCQ measures, ranging from -28 to 28
Alabama (n=42)	Mean	55.8	71.8	14.19
	SD	13.93	29.1	11.67
	Mean Change	**3.08**	**1.32**	**3.9***
Michigan (n=48)	Mean	77.02	78.43	17.36
	SD	11.34	24.7	7.09
	Mean Change	**5.87*****	**-0.37**	**7.8*****
Ohio (n=51)	Mean	68.63	74.63	13.98
	SD	9.53	22.62	8.42
	Mean Change	**0.59**	**7.77**	**4.3*****
Tennessee (n=62)	Mean	55.81	12.05	14.26
	SD	14.29	27.61	8.96
	Mean Change	**3.21***	**0.53**	**5.2*****
Total (n=203)	Mean	64.95	62.47	14.99
	SD	15.07	36.04	8.96
	Mean Change	**3.16*****	**2.69****	**5.42*****

*p<0.1; **p<0.05; ***p<0.01

3.2. Analyses of Changes in Outcome Measures Over Time

In the previous section, bivariate analyses examining the change in outcomes pre- and post-intervention without adjusting for explanatory and control variables showed statistically significant improvements in all measures between the pre- and post-intervention periods. This indicates that EvidenceNOW: BSC had a positive impact on percent hypertensive patients with adequate blood pressure control, percent tobacco users receiving tobacco cessation counseling, and practice capacity for change.

The following section describes the changes in outcomes post-intervention when controlling for explanatory and control variables in regression models. Adjusting for explanatory and control measures using regression analysis allows us to better understand how much of a change in outcomes from pre- to post-intervention can be attributed to EvidenceNOW: BSC relative to other factors that may contribute to changes in outcomes over time. Additionally, including explanatory and control variables in our models can help us understand which factors were associated with an increase and/or decrease in outcomes, holding all other factors constant.

3.2.1. Tobacco Cessation

Across grantees, the mean percentage of tobacco users who received tobacco cessation counseling was significantly higher by 3.40 percentage points in the post-intervention period, compared to baseline (p=0.09; See Exhibit 13), indicating a positive association between EvidenceNOW: BSC active QI support and tobacco cessation counseling, even when controlling for explanatory and control variables

VBP model payer type was also associated with significantly higher mean tobacco cessation counseling. Specifically, practices participating in a VBP model with private/commercial payers had a mean percent

tobacco cessation of 8.19 percentage points higher than practices participating in VBP models without private/commercial payers (p=0.01).

Factors associated with a significantly lower percentage of smokers who received tobacco cessation counseling included Rural Area Commuting (RUCA) Codes, medically underserved area (MUA) designation, VBP model payer type, and total hours receiving active QI support. Specifically, practices located in Suburban RUCA codes had 17.52 percentage points lower mean tobacco cessation counseling provided than practices located in urban core RUCAs (p=0.07); practices in medically underserved areas (MUAs) had 13.37 percentage points lower mean percent tobacco cessation counseling provided, compared to practices located in non-MUAs (p<0.01); practices participating in VBP models with Medicaid as a payer had a mean percentage of smoker receiving tobacco cessation counseling that was 10.94 percentage points lower than practices participating in VBP models without Medicaid as a payer (p=0.01). Also, practices that engaged in >10 hours of active implementation activities had a mean percent tobacco cessation counseling of 35.06 percentage points lower than practices that engaged in <5 hours of active implementation activities (p<0.01).

Practice size, specialty mix, VBP model type "Other," VBP model payer type "Other," and percent practice population ages 18-64 were excluded from this model to preserve power, given the smaller sample size. Ownership, major disruptive events, baseline CPCQ score, percent practice population Black, percent population Hispanic, and number of clinicians were not associated with mean percent tobacco cessation counseling.

Exhibit 13. Association of EvidenceNOW: BSC and percent tobacco users receiving tobacco cessation counseling

Practice Characteristics[2]	Coefficient	Std. err.	z	P>z	95% CI	
Timepoint (ref=Baseline)						
Post-intervention	3.40	2.00	1.70	0.09	-0.51	7.31
Grantee (ref=AL)[1]						
MI	8.35	6.25	1.34	0.18	-3.90	20.60
OH	-9.03	6.92	-1.31	0.19	-22.59	4.52
Ownership (ref=Clinician owned)						
Hospital/health system	-11.04	9.92	-1.11	0.27	-30.48	8.39
Safety Net	-9.16	7.78	-1.18	0.24	-24.40	6.08
Other	0.50	9.34	0.05	0.96	-17.80	18.81
Rural-Urban Commuting Area Codes (RUCA - ref=Urban core)						
Large town	-2.62	7.10	-0.37	0.71	-16.53	11.29
Rural area	1.81	7.69	0.23	0.81	-13.27	16.88
Suburban	-17.52	9.78	-1.79	0.07	-36.69	1.66
Medically Underserved Area	-13.37	4.46	-3.00	0.00	-22.12	-4.63
VBP Primary Participation	3.30	4.55	0.73	0.47	-5.61	12.21
VBP ACO Participation	-5.81	4.60	-1.26	0.21	-14.82	3.20
VBP Medicare Payer	4.82	4.14	1.17	0.24	-3.29	12.92
VBP Medicaid Payer	-10.94	4.37	-2.50	0.01	-19.51	-2.37
VBP Private/Commercial Payer	8.19	3.28	2.50	0.01	1.77	14.61
Major Disruptive Events (ref=no major disruptive event)						
One disruption	2.39	4.20	0.57	0.57	-5.85	10.62
More than one major disruption	6.47	4.23	1.53	0.13	-1.82	14.76

Practice Characteristics[2]	Coefficient	Std. err.	z	P>z	95% CI	
Active Implementation Hours (ref=<5 hours)						
5-10 hours	-1.89	5.07	-0.37	0.71	-11.83	8.05
>10 hours	-35.06	10.31	-3.40	0.00	-55.27	-14.84
Baseline CPCQ score (continuous)	-0.10	0.20	-0.49	0.62	-0.49	0.29
Percent Practice Population: Black	0.04	0.09	0.47	0.64	-0.14	0.22
Percent Practice Population: Hispanic	-0.07	0.10	-0.68	0.50	-0.27	0.13
Number of Clinicians	-0.06	0.11	-0.55	0.58	-0.29	0.16
Constant	96.79	11.97	8.09	0.00	73.33	120.25

Source: Grantee-reported practice-level data (2021-2023).

Notes: N=186 (93 practices with two timepoints each). R-squared = 0.40. [1]TN was excluded from the tobacco cessation model because they collected their tobacco cessation outcome measure differently than other grantees. [2] Practice size, Specialty-mix, VBP Other participation, VBP other payer type, and percent population ages 18-24 were intentionally left out of this model to adjust for power.

3.2.2. Blood Pressure Control

Mean percent hypertensive patients with adequate blood pressure control was significantly higher by 3.18 percentage points post-intervention compared to baseline ($p<0.01$; See Exhibit 16), indicating a positive association between the active QI support provided in EvidenceNOW: BSC and blood pressure control when adjusting for explanatory and control variables.

Grantee fixed effects showed significant differences between grantees in percent adequate blood pressure control. Specifically, Michigan and Ohio practices had significantly higher mean percent blood pressure control than Alabama practices (14.2 and 11.74 percentage points higher, respectively; $p<0.01$), and Tennessee practices had a 9.3 percentage points lower percent mean blood pressure control than Alabama practices ($p=0.01$; See Exhibit 14).

Factors associated with significantly lower mean percent blood pressure control include practice size, RUCA, population race, and population age. Specifically, practices with 11 or more clinicians had 6.96 percentage points lower percent blood pressure control than solo practices ($p=0.096$); practices located in rural RUCAs had 6.16 percentage points lower mean percent blood pressure control compared to practices located in urban core RUCAs ($p=0.09$); each one percentage point increase in practice Black population was associated with a 0.11 percentage point lower mean blood pressure control ($p=0.01$); and each one percentage point increase in practice population aged 18-64 was associated with a 0.24 percentage point lower mean blood pressure control ($p=0.01$).

Exhibit 16. Association of EvidenceNOW: BSC and percent hypertensive patients with adequate blood pressure control

	Coefficient	Std. err.	z	P>z	95% CI	
Timepoint (ref=Baseline)						
Post-intervention	3.18	0.99	3.22	0.00	1.24	5.12
Grantee (ref=AL)						
MI	14.20	2.78	5.11	0.00	8.75	19.65
OH	11.74	3.09	3.80	0.00	5.69	17.79
TN	-9.30	3.48	-2.67	0.01	-16.12	-2.48
Practice Size (ref=Solo practice)						
2–5 clinicians	-3.81	3.16	-1.21	0.23	-10.00	2.37
6–10 clinicians	-6.15	3.85	-1.60	0.11	-13.70	1.40

	Coefficient	Std. err.	z	P>z	95% CI	
11–15 clinicians	-6.96	4.18	-1.66	0.10	-15.17	1.24
Ownership (ref=Clinician owned)						
Hospital/health system	0.77	4.37	0.18	0.86	-7.80	9.34
Safety Net	-3.42	3.74	-0.92	0.36	-10.74	3.90
Other	1.40	4.10	0.34	0.73	-6.64	9.44
Specialty Mix (ref=Single-specialty)						
Multi-Specialty	-0.33	2.13	-0.15	0.88	-4.51	3.85
Rural-Urban Commuting Area Codes (RUCA–ref=Urban core)						
Large town	0.34	3.26	0.10	0.92	-6.06	6.74
Rural area	-6.16	3.66	-1.68	0.09	-13.33	1.01
Suburban	-1.47	4.69	-0.31	0.75	-10.66	7.72
Medically Underserved Area	0.37	2.75	0.13	0.89	-5.03	5.76
VBP Primary Care Transformation Participation	3.51	2.19	1.60	0.11	-0.78	7.80
VBP ACO Participation	0.53	2.28	0.24	0.81	-3.92	4.99
VBP Other Participation	1.06	1.99	0.53	0.59	-2.84	4.96
VBP Medicare Payer	2.29	2.22	1.03	0.30	-2.06	6.64
VBP Medicaid Payer	-0.25	2.25	-0.11	0.91	-4.66	4.15
VBP Private/Commercial Payer	-0.51	1.58	-0.33	0.74	-3.61	2.58
VBP Other Payer	3.13	2.93	1.07	0.29	-2.62	8.88
Major Disruptive Events (ref=no major disruptive event)						
One disruption	-0.45	2.21	-0.21	0.84	-4.78	3.87
More than one major disruption	0.21	2.17	0.10	0.92	-4.05	4.46
Active Implementation Minutes						
5-10 hours	0.26	2.29	0.11	0.91	-4.23	4.74
>10 hours	-0.86	3.22	-0.27	0.79	-7.18	5.46
Baseline CPCQ score (continuous)	0.04	0.09	0.48	0.63	-0.13	0.22
Percent Practice Population: Black	-0.11	0.04	-2.60	0.01	-0.19	-0.03
Percent Practice Population: Hispanic	-0.04	0.04	-0.97	0.33	-0.12	0.04
Percent Practice Population: Ages 18–64	-0.24	0.10	-2.43	0.01	-0.43	-0.05
Number of Clinicians	-0.04	0.09	-0.42	0.68	-0.20	0.13
Constant	76.70	8.18	9.38	0.00	60.67	92.73

Source: Grantee-reported practice-level data (2021-2023).

Notes: N=242 (121 practices with two timepoints each). R-squared=0.62

3.2.3. Practice Capacity

Mean Change Process Capacity Questionnaire (CPCQ) Index Score was significantly higher by 4.79 points post-intervention, compared to baseline (p=0.00; See Exhibit 18), indicating a positive association

between EvidenceNOW: BSC QI support interventions and CPCQ index score, when adjusting for explanatory and control variables

Practice ownership and VBP model payer type were also associated with a higher mean CPCQ index score. Specifically, practices with safety net ownership had 6.39 points higher mean CPCQ index scores than clinician owned practices (p=0.04). Participation in a VBP model with a private/commercial payer was associated with a 5.16 points higher mean CPCQ index score versus participation in a VBP model without private/commercial payer (p=0.00).

VBP model payer type and major disruptive events were associated with a lower CPCQ score. Specifically, participating in a VBP model with Medicaid as a payer was associated with a 4.45 point lower CPCQ index score, compared to participating in a VBP model without Medicaid as a payer (p=0.02). Practices with more than one major disruptive event had a 4.74 point lower CPCQ index score than practices that had no major disruptive events (p=0.04).

Grantee, practice size, specialty mix, RUCA, MUA, VBP participation type, active implementation hours, percent population Black, Hispanic, and ages 18-64, and number of clinicians were not associated with CPCQ index score.

Exhibit 18. Association of EvidenceNOW: BSC and Change Process Capacity Questionnaire (CPCQ) Index score

	Coefficient	Std. err.	z	P>z	95% CI	
Timepoint (ref=Baseline)						
Post-intervention	4.79	0.99	4.83	0.00	2.84	6.74
Grantee (ref=AL)						
MI	-0.48	3.24	-0.15	0.88	-6.82	5.87
OH	2.21	3.51	0.63	0.53	-4.67	9.09
TN	0.63	3.28	0.19	0.85	-5.80	7.06
Practice Size (ref=Solo practice)						
2–5 clinicians	0.26	3.06	0.08	0.93	-5.75	6.27
6–10 clinicians	1.24	3.14	0.39	0.69	-4.92	7.39
11–15 clinicians	-1.48	3.94	-0.38	0.71	-9.21	6.25
Ownership (ref=Clinician owned)						
Hospital/health system	5.05	3.15	1.60	0.11	-1.12	11.22
Safety Net	6.22	3.18	1.96	0.05	-0.01	12.44
Other	0.74	3.51	0.21	0.83	-6.14	7.63
Specialty Mix (ref=Single-specialty)						
Multi-Specialty	1.47	2.02	0.73	0.47	-2.48	5.42
Rural-Urban Commuting Area Codes (RUCA–ref=Urban core)						
Large town	-2.57	3.69	-0.70	0.49	-9.80	4.65
Rural area	0.38	5.38	0.07	0.94	-10.17	10.93
Suburban	-1.32	3.29	-0.40	0.69	-7.77	5.12

	Coefficient	Std. err.	z	P>z	95% CI	
Medically Underserved Area	-0.47	2.38	-0.20	0.84	-5.14	4.20
VBP Primary Care Transformation Participation	0.80	1.79	0.45	0.65	-2.70	4.31
VBP ACO Participation	-0.20	1.94	-0.10	0.92	-4.01	3.62
VBP Other Participation	1.73	1.76	0.98	0.33	-1.73	5.19
VBP Medicare Payer	1.54	1.85	0.83	0.41	-2.09	5.18
VBP Medicaid Payer	-4.45	1.87	-2.38	0.02	-8.12	-0.78
VBP Private/Commercial Payer	5.16	1.77	2.92	0.00	1.69	8.63
VBP Other Payer	-3.63	2.24	-1.62	0.10	-8.02	0.75
Major Disruptive Events (ref=no major disruptive event)						
One disruption	-2.24	2.43	-0.92	0.36	-7.01	2.52
More than one major disruption	-4.74	2.28	-2.08	0.04	-9.21	-0.28
Active Implementation Hours (ref=<5 hours)						
5-10 hours	0.83	2.06	0.40	0.69	-3.21	4.86
>10 hours	2.34	2.74	0.86	0.39	-3.02	7.70
Percent Practice Population: Black	-0.02	0.04	-0.41	0.68	-0.09	0.06
Percent Practice Population: Hispanic	0.02	0.05	0.47	0.64	-0.07	0.12
Percent Practice Population: Ages 18-64	-0.05	0.08	-0.64	0.52	-0.21	0.11
Number of Clinicians	-0.09	0.07	-1.30	0.19	-0.23	0.05
Constant	10.30	8.12	1.27	0.20	-5.60	26.21

Source: Grantee-reported practice-level data (2021-2023).

Notes: N=226 (113 practices with two timepoints each). R-squared=0.24

3.2.4. Sensitivity Analyses

Alternate specifications of QI support

Models using active minutes as a continuous variable had similar results to main models where QI support was measured using a categorical variable of hours of active QI support. All outcomes still had significantly higher mean values at the post-intervention timepoint, and explanatory variables were mostly similar, with a few exceptions. When specifying QI support as continuous minutes, rather than categorical hours, Michigan practices had significantly higher mean tobacco cessation than Alabama practices. Practices with 11+ clinicians no longer had significantly lower mean percent blood pressure control than solo practices. Finally, practices with hospital/health system ownership had significantly higher mean practice change capacity than clinician owned practices.

Models using active interactions as a continuous variable had results similar to the models using active minutes as a continuous variable. Compared to the final models using a categorical active hours variable, the active interactions models also showed significant differences in grantee in the percent tobacco

control model, practice size was no longer significantly different in the percent blood pressure control model, and hospital/health system ownership had significantly higher mean practice capacity for change score. The only difference was that practices in Ohio had significantly lower percent tobacco cessation than practices in Alabama in the active interactions model, versus practices in Michigan having significantly higher percent tobacco cessation than Alabama in the active minutes model.

Models with an emphasis on disparities

Only two sites submitted outcomes stratified by race. Due to sample size concerns, we would have to remove several variables from the models to preserve power, so we did not pursue these analyses further.

Also due to power concerns, we only assessed models with an interaction in timepoint and race for blood pressure control and CPCQ. In both models, the interaction term was insignificant, the main effects of timepoint and percent Black patient population were unchanged in terms of significance and direction. The insignificant race/timepoint interaction term indicates there is not a significant difference in outcomes over time between differing levels of percent Black population in our models.

In models that used a categorical variable for percent Black population quartile, instead of a continuous percent variable, outcomes were generally comparable in terms of main effects. As with the other sensitivity tests, the tobacco cessation model was not adequately powered without removing several key variables. Overall, results from these models were comparable to the main models, with some differences in significance for explanatory and/or control variables, particularly in the blood pressure control model. For CPCQ score, the only differences from the main models were that participation in VBP with other payer was no longer significant. Everything else was the same, and we see no significant difference in effects by percent Black population.

For blood pressure control, the main effect of change in outcome pre- to post-intervention was similar to the main models (3.10 percentage points, p=0.00), and grantee fixed effects were comparable in terms of effect direction and significance. However, we see several differences in covariates. Practice sizes of 6-10 clinicians had significantly lower percent blood pressure control than solo practices (-6.77 percentage points, p=0.06); rural areas no longer had significantly lower blood pressure control than urban areas; practices with primary VBP participation type had significantly higher percent blood pressure control than practices without VBP primary participation type (3.80 percentage points, p=0.07); practices with Medicare payer had significantly higher percent blood pressure control than practices without VBP Medicare payer (3.55 percentage points, p=0.08); and every one percent increase in percent Hispanic population was associated with a 0.10 percentage point decrease in percent blood pressure control (p=0.04). In terms of percent black population, our main models showed that every one percentage point increase in percent Black population was associated with a 0.11 percentage point lower percent blood pressure control. When looking at quartiles of percent Black population, we see an interesting trend. When compared to the first quartile of percent Black population (i.e. the lowest percent Black population), the second quartile had significantly higher percent blood pressure control (5.35 percentage points, p=0.03), and the fourth quartile of percent Black population was associated with a lower percent blood pressure control (-5.38 percentage points, p=0.08). This suggests that EvidenceNOW: BSC was associated with an increase blood pressure control among practices with percent black population to some extent in the 2nd quartile of percent black population. However, EvidenceNOW: BSC was not associated with a significant difference in blood pressure control between the 1st and 3rd quartile of percent Black population, and was associated with a significantly lower percent blood pressure control in the 4th quartile/highest percent Black population compared to the 1st quartile/lowest percent Black population.

4. What We Have Learned

4.1. Discussion of Findings

Findings from the analyses of the practice-level data from the EvidenceNOW: BSC QI support interventions indicate that practices improved on all three outcomes of interest when controlling for practice characteristics and other relevant internal and external factors. The mean percentage of tobacco users receiving tobacco cessation was 3.40 percentage points higher overall, the percentage of hypertensive patients with adequate blood pressure control was 3.18 percentage points higher overall, and CPCQ index scores was 4.79 points higher overall. These overarching findings indicate that EvidenceNOW: BSC was associated with significant improvement in both clinical outcomes and practice capacity.

In addition, we identified several key factors associated with significant changes in outcomes over time. There were significant differences between grantees in terms of blood pressure control, but not tobacco cessation or CPCQ Index scores. Our tobacco cessation model was reduced to preserve power, but the significant difference between grantee in blood pressure control could reflect that clinical measures may more easily improve than the practice change capacity score. Baseline CPCQ scores were already relatively high at baseline, likely reflecting that the practices willing to participate in the intervention already had higher than average practice capacity.

Interestingly, practice size was only associated with blood pressure control. Practices that had 11 or more clinicians had a significantly lower mean percentage of hypertensive patients with adequate blood pressure control compared to solo practices. It seems intuitive that more staff would mean more capacity to deliver care and lead to better clinical outcomes, so this finding could be due to small cell size for practices with 11+ clinicians.

Our findings also show geographic and community-level factors were associated with clinical outcomes. Compared to urban core RUCAs, rural area RUCAs had significantly lower mean percent blood pressure control, and suburban areas had significantly lower mean percent tobacco cessation. Additionally, we see that practices located in areas with an MUA designation had significantly lower mean percent tobacco cessation than practices located in areas without an MUA designation. This could be due to limited access; it can be more difficult to access care when you live in a rural/suburban area due to lower concentration of providers and/or longer commuting times required to reach providers. This decrease in mean clinical measures could also be due to higher levels of smoking and hypertension in areas with suburban and rural RUCAs and MUA designation statuses. If baseline smoking or hypertension levels are higher in these areas, it could be more difficult to see significant improvements in model outcomes controlling for all other covariates.

VBP payer type was associated with tobacco cessation and CPCQ index score. Participation in a VBP with a private/commercial payer was associated with a higher mean percent tobacco cessation and CPCQ score. We see that participation in a VBP model with Medicaid as a payer was associated with a lower tobacco cessation and CPCQ index score. Medicaid eligibility is based on income and varies by state, which leads to lower and varying levels of insurance coverage. Although the ACA also mandated that Medicaid plans must cover evidence-based preventive services at no cost sharing, lower levels of Medicaid coverage and state variability in coverage might lead to lower utilization and therefore a lower likelihood of receiving smoking cessation counseling, or the population of Medicaid enrollees often being of lower socioeconomic status which is associated with higher rates of smoking.

We see that having multiple major disruptive events was associated with lower CPCQ scores but was not significantly associated with clinical outcomes. This makes sense; the practice's ability to progress in

change seems more likely to be affected by a major disruptive event than patient care. Following a major disruptive event, practices may focus on delivering care, rather than improving practice capacity change efforts.

Interestingly, practices with greater than 10 active implementation hours had significantly lower mean percent tobacco cessation. The amount of active intervention minutes was also negatively associated with percent blood pressure control and positively associated with CPCQ score, but these changes were not significant. This could be due to practices with lower baseline outcomes needed more support time and seeing smaller changes in outcomes after the intervention. This could also be due to the percent tobacco cessation model having reduced number of covariates in the model to preserve power after dropping TN practices. Additionally, there were notable differences between grantees in the amount of active hours per practice, which could further contribute to smaller cell sizes when combined with the limited sample size due to the exclusion of TN practices from this model.

On a similar note, in terms of population demographics, percent Black population and percent population aged 18–64 were both associated with a lower percent blood pressure control. We know that there are disparities across racial groups in terms of hypertension levels and access to care, so this finding supports the idea that perhaps we see lower levels of improvement in practices with higher baseline rates of hypertension.

Finally, we see no association between any of our outcomes and specialty mix, baseline CPCQ score (for clinical measures), population ethnicity, and number of clinicians.

4.2. Limitations

These findings have several limitations. Each grantee implemented the QI intervention and their individual evaluations in different ways. While the overarching initiative level evaluation aligned and harmonized practice characteristic and outcome measures, grantees varied in their ability to collect data at the recommended timepoints. Grantees reported significant challenges collecting data from practices[16] and some grantees ultimately decided to change their data collection plans to reduce burden. Additionally, each grantee collected the QI intervention data in different manners and most of the rich data related to QI strategies and intervention content could not be harmonized across grantees. Some grantees used data collection forms with a range of activities for the practice facilitator/practice coach to select, whereas others used a free-text field to indicate what transpired in the interaction. This variation impacted the ways in which the data could be summarized across grantees and limited its utility in analyses of changes in outcome measures over time.

As previously discussed, grantees struggled to initially recruit and at times retain practices in the intervention. Two grantees were unable to ultimately implement the intended stepped wedge design because of low recruitment.[17] EvidenceNOW: BSC was launched in the first year of the COVID-19 public health emergency; grantees reported that other demands, especially those coming from the public health emergency and its impact on the health workforce, decreased engagement in this project. Varying success with recruitment also resulted in different intervention periods across the grantees. In interviews, project leaders described how practices' concerns about participating related to bandwidth and practice champion's available time led to adaptations in the intended intervention to allow for more "low-touch" and supportive engagement.[18]

[16] See Interim Evaluation Report II – Section 4 for a discussion of grantee challenges collecting data from practices.

[17] See the Interim Evaluation Report II – Section 4 for more detail about challenges implementing a stepped wedge trial.

[18] See the Interim Evaluation Report II – Section 4 for more information about the impact of resource constraints and bandwidth on engagement, and how the grantees adjusted their intervention to match the needs of practices.

In addition, we were limited in both the types of analyses we could perform and the factors we could include in our analyses as control variables by our total practice sample size.

4.3. Conclusions

We offer the following conclusions and recommendations based on our findings:

- **EvidenceNOW: BSC QI support was associated with improvements in clinical outcomes and practice capacity** even with the wide variation in the active QI support interventions provided to practices across grantees. EvidenceNOW: Advancing Heart Health similarly found improvements across their clinical outcomes and practice capacity.[19]

- **Practice ownership was not associated with either clinical outcome**, in contrast to findings in other EvidenceNOW initiatives.

- **Practice capacity was improved, especially for practices with safety net ownership.** Practice ownership was associated with mean CPCQ index score in regression models. Practices with safety net ownership had 6.39 points higher mean CPCQ index scores than clinician owned practices (p=0.04).

- **Value-based payment (VBP) was associated with higher mean tobacco cessation counseling and practice capacity.** Specifically, participation in a VBP model with a private/commercial payer was associated with a 4.92 point higher mean CPCQ index score versus participation in a VBP without private/commercial payer (p=0.05).

- **Major disruptive events in primary care were associated with lower practice capacity in our study, but not clinical outcomes.** While Marino et al (2022) found[20] disruptions was associated with at least on clinical outcome in EvidenceNOW: Advancing Heart Health practices, we did not find an association with clinical outcomes.

- **Future QI initiatives may benefit from early harmonization and agreement on a minimum dataset and definitions, consistently captured in grantees' QI support interventions (e.g., dosage, mode, content).** Early in the evaluation, our team characterized each grantee's QI support strategies and planned interventions. We also sought information on how each grantee was going to capture their QI support intervention data; however, we were ultimately limited to the lowest, common data on interventions captured by each grantee, which was the date, mode of interaction, and minutes of interaction. We then classified to the extent we could what interactions would be considered active (i.e., in-person, virtual, telephone) and passive (i.e., email, learning collaborative session). Yet, even within this approach, there are likely some substantial differences in the nature of the active interactions. More comparable data points on the QI support interventions – with sufficient sample size – may allow for an evaluation of range of points variation in QI support approaches and any differential associations with outcomes. While implementation scientists have outlined a range of implementation strategies, Perry et al (2019) specified and compared the strategies used across EvidenceNOW: Advancing Heart Health grantees and found thirty-three different strategies,[21]

[19] Advancing Heart Health. Content last reviewed March 2024. Agency for Healthcare Research and Quality, Rockville, MD. https://www.ahrq.gov/evidencenow/projects/heart-health/index.html

[20] Marino M, Solberg L, Springer R, McConnell KJ, Lindner S, Ward R, Edwards ST, Stange KC, Cohen DJ, Balasubramanian BA. Cardiovascular Disease Preventive Services Among Smaller Primary Care Practices. Am J Prev Med. 2022 May;62(5):e285-e295. doi: 10.1016/j.amepre.2021.10.011. Epub 2021 Dec 20. PMID: 34937670.

[21] Perry CK, Damschroder LJ, Hemler JR, Woodson TT, Ono SS, Cohen DJ. Specifying and comparing implementation strategies across seven large implementation interventions: a practical application of theory. Implement Sci. 2019 Mar 21;14(1):32. doi: 10.1186/s13012-019-0876-4. PMID: 30898133; PMCID: PMC6429753.

although a more parsimonious set may be prudent. Solberg et al (2022) outlined a taxonomy for external support, which consists of 7 domains: conceptual model, support strategies, care change focus, change process, prescriptively, standardization, and dose/mode.[22]

[22] Solberg LI, Kuzel A, Parchman ML, Shelley DR, Dickinson WP, Walunas TL, Nguyen AM, Fagnan LJ, Cykert S, Cohen DJ, Balasubramanaian BA, Fernald D, Gordon L, Kho A, Krist A, Miller W, Berry C, Duffy D, Nagykaldi Z. A Taxonomy for External Support for Practice Transformation. J Am Board Fam Med. 2021 Jan-Feb;34(1):32-39. doi: 10.3122/jabfm.2021.01.200225. PMID: 33452080; PMCID: PMC9190131.

Appendix A – Overview of QI Support Interventions by Grantee

Alabama Cardiovascular Cooperative

The Alabama Cardiovascular Cooperative (ACC) continued its interventions and quality improvement (QI) support to 50 practices in the final year of the project. It used practice facilitation as its main approach for QI support with practices. It identified several factors that facilitated success of the intervention and QI support, as well as factors that created challenges for successful implementation.

Exhibit 4. Overview of Alabama Intervention and Quality Improvement Support Strategies

Intervention Overview	
Intervention Length	• 12 months
Evidence-Based Interventions	• Create and use a registry. • Track progress on QI activities. • Define care team roles. • Create panels of patients. • Identify needed services for patients. • Select evidence-based practice protocols. • Create and establish team workflows. • Implement home-self monitoring and telephone management. • Train staff in self-management support. • Set patient goals collaboratively. • Use teach-back methods. • Link patients with community resources.
QI Support Strategies	
Practice facilitation	• Monthly in-person visits (at least one in person each quarter) over the course of 12 months. • Post-intervention phone calls/emails between meetings to check on progress (three/month). • Assess for readiness and identify barriers and facilitators.
Health IT support	• PFs provide monthly and ad hoc data support for manual EHR pulls.
Education and training	• ACC work group identifies and develops educational materials during monthly meetings. • PFs distribute educational materials and conduct educational meetings during monthly site visits and as requested by practices.
Data, feedback, and benchmarking	• ACC contracted data experts to assist with creating dashboards.

ACC=Alabama Cardiovascular Cooperative. EHR=electronic health record. PF=Practice Facilitator. QI=quality improvement.

Healthy Hearts for Michigan

For Healthy Hearts for Michigan (HH4M), practice facilitation was the central component, and Practice Facilitators (PFs) provided health IT support to encourage practices to regularly track their heart health QI metrics. HH4M used incentives to encourage the submission of timely data. It provided continuing education credits to encourage clinician engagement.

Exhibit 5. Overview of Michigan Intervention and Quality Improvement Support Strategies

Intervention Overview	
Intervention Length	• 12 months
Evidence-Based Interventions	• Accurate blood pressure measurement. • Hypertension management (Hiding In Plain Sight protocol). • Self-measured blood pressure. • Tobacco smoking cessation (state quit line).
QI Support Strategies	
Practice facilitation	• In-person or virtual practice facilitation one or two times per month, for approximately 1 hour, over the course of 12 months.
Health IT support	• PFs provide support with EHR systems.
Incentives	• Financial incentive for time spent completing data collection activities ($1,000). • PI CME credits and MOC Part IV credits.

CME=Continuing Medical Education. EHR=electronic health record. MOC=Maintenance of Certification. Performance Improvement=PI. PF=Practice Facilitator.

Heart Healthy Ohio Initiative

In the final year of the project, the Heart Healthy Ohio Initiative (HHOI) continued implementation of its 12-month intervention to improve cardiovascular health services. It implemented a multipronged approach for providing QI support that included virtual practice facilitation, data feedback and benchmarking, and opportunities for shared learning among practices.

Exhibit 6. Overview of Ohio Intervention and Quality Improvement Support Strategies

Intervention Overview	
Intervention Length	12 months
Evidence-Based Interventions	Accurate assessment and measurement: Good blood pressure measurement technique; smoking assessment at each visit; assess medication taking. Appropriate and timely treatment: Medication management; timely post-intervention; lifestyle monitoring; smoking cessation support; medication adherence strategies. Effective outreach: Standardize processes; multiple modalities. Effective communication: Empathy, nonverbal strategies, cultural humility, health literacy, implicit bias; motivational interviewing. Healthy equitable environment of care: Identifying and addressing social determinants of health. Effective supportive relationships: Team-based care. Screened and well-managed behavioral health: Screening and addressing depression and substance use.
QI Support Strategies	
Practice facilitation	PFs meet virtually with practices monthly. Review data dashboard and site progress towards established goals. Provide targeted technical assistance to address implementation challenges.

Intervention Overview	
Health IT support	One-on-one health IT support is available to sites to ensure accuracy and completeness in reporting. Coding and specific tools for use with Epic EHR systems are available to aid data aggregation methods and reporting.
Shared learning / education and training	Conduct quarterly learning webinars to foster cross-site collaboration.
Data feedback and benchmarking	Intervention sites work with PFs and their staff to set data benchmarks and progress goals at project outset. Use digital dashboard to visually convey data as part of monitoring and individual site assessment of progress.
Incentive	Financial incentive for completing data collection activities ($4,000 in Year 1; $1,000 in Year 2). MOC and/or CEU/CME credits available.

CEU=Continuing Education Units. CME=Continuing Medical Education. EHR=electronic health record. IT=information technology. MOC=Maintenance of Certification. PF=Practice Facilitator.

Tennessee Heart Health Network

Tennessee Heart Health Network (THHN) was unique in that it proposed to implement three evidence-based toolkits, in addition to conducting practice facilitation and learning collaboratives. THHN also implemented a data registry, the TN-POPnet, that allowed participating practices to submit data feeds and receive quarterly reports with state-level benchmarks on heart-health QI metrics.

Exhibit 7. Overview of Tennessee Intervention and Quality Improvement Support Strategies

Intervention Overview	
Intervention Length	12 months
Evidence-Based Interventions	Health coaching. Pharmacist-physician collaboration. Heart health text messaging.
QI Support Strategies	
Practice facilitation	Monthly PF visits (at least one in-person visit each quarter). Review data dashboard. Identify barriers and facilitators to evidence-based intervention toolkit implementation.
Health IT support	The PFs review data (from TN-POPnet or own EHR) during monthly meetings with practice.
Shared learning	Two to four topic-based learning collaborative sessions per month. Experts speak on topics suggested by participants.
Data feedback and benchmarking	Using the TN-POPnet to support data analytics and benchmarking. Provides data dashboards comparing own with network's practices data.

EHR=electronic health record. PF=Practice Facilitator. TN-POPnet=Tennessee Population Health Data Network.

The THHN was unique in that its intervention involved the development and implementation of three evidence-based toolkits as part of the QI support. During the initial meeting with each practice, the PFs introduced the toolkits and related goals and expectations. After the first month of the project, each practice selected which toolkit(s) it wanted to implement; each practice had to select one but could have selected all three:

- Health Coaching provided training for new or existing staff in motivational interviewing to support patients to improve management of heart-related chronic conditions. Each practice that selected this toolkit was able to send one or two staff to the motivational interviewing training. Additional training

was provided for the identified health coach to support person-centered conversations using motivational interviewing to change patient behavior.

- The Pharmacist-Physician Collaboration supported the development of pharmacist-physician partnerships to engage patients by using motivational interviewing to improve management of heart-related chronic conditions. This training focused on physicians partnering with clinical pharmacists to engage with and bill patients for additional educational and supportive services, such as tobacco cessation, cardiovascular risk counseling, diabetes self-management training, transitional care management, chronic care management, and remote patient monitoring.
- Heart Health Messages provided automated, evidence-based heart health text messages to patients to give ongoing guidance and facilitate care. There were significant challenges with implementation of this toolkit, including issues contracting with the text messaging vendor, challenges getting the data feed of patient contact information to initiate text messaging, and concerns related to patients opting-in to the text messaging service. By the end of the intervention, patients from only two practices had received heart health–related text messages.

Exhibit Y. Intervention (QI Support) Content and Scope Information Available by Grantee

Alabama	Ohio	Michigan	Tennessee
• **Select all key drivers addressed during the interaction:** • Clinical Information System • Team Engagement, Optimized Care, and Outreach • Standardized Care Processes • Self-Management Support	• **Select all content addressed during the interaction:** • Evidence-based psychosocial care • Use of a treatment algorithm • Quality improvement methods • Workflow mapping • Prioritizing QI activities • Care team roles and responsibilities • Blood Pressure Measurement • Tobacco cessation activities • Tobacco screening • Data extraction, management, cleaning or visualization • Progress toward care process goals • Progress toward clinical outcome goals • Care coordination • Behavioral health appointments • Self-management support • Social determinants of health screening • Community referrals • Engaging patients in QI • Project overview • Other topics	• **Select all educational topics covered during the interaction:** • Model for improvement, PDSA, or other QI method • Project management • Team-based care • Motivational interviewing • Self-management goal setting • BP and Smoking (clinical or measurement aspects) • EHR use or other optimization of data systems • Use of popHealth CQM dashboard and/or outlier list • Other education • **Select all interventions addressed during the interaction:** • BP Measurement competency training/program • HTN Hiding In Plain Sight (HIPS) • Self-Measured Blood Pressure (SMBP) Program • Ask-Advise-Refer Tobacco Cessation • Implement protected time for staff to do QI work • Patient education tools address health literacy • Implement referral tracking • Establish care coordination process • Implement team-based care • Establishing a QI team • Team huddle that include pre/post visit planning • Activated clinical decision support system • Conducted data collection/chart audits	• **Open text field describing interaction mode and/or content. Examples include:** • Practice facilitation • Practice Facilitation - Onsite Request • Practice Facilitation - Onsite Visit • Practice Facilitation - Staff Meeting Site Visit • Practice Facilitation - Subaward • Mockingbird Learning Collaborative • Data for baseline submission