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Assessing local capacity to expand rural breast cancer screening and patient navigation: An iterative mixed-method tool

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Abstract

Background—Despite federal funding for breast cancer screening, fragmented infrastructure and limited organizational capacity hinder access to the full continuum of breast cancer screening and clinical follow-up procedures among rural-residing women. We proposed a regional *hub-and-spoke* model, partnering with local providers to expand access across North Texas. We describe development and application of an iterative, mixed-method tool to assess county capacity to conduct community outreach and/or patient navigation in a partnership model.

Methods—Our tool combined publicly-available quantitative data with qualitative assessments during site visits and semi-structured interviews.

Results—Application of our tool resulted in shifts in capacity designation in 10 of 17 county partners: 8 implemented local outreach with hub navigation; 9 relied on the hub for both outreach and navigation. Key factors influencing capacity: (1) formal linkages between partner organizations; (2) inter-organizational relationships; (3) existing clinical service protocols; (4) underserved populations. Qualitative data elucidate how our tool captured these capacity changes.

Conclusions—Our capacity assessment tool enabled the hub to establish partnerships with county organizations by tailoring support to local capacity and needs. Absent a vertically

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Compliance with Ethical Standards

Conflict of interest

The authors declare that they have no conflict of interest.

Research involving human participants

Research for this study complied with relevant ethical standard for human subject protections, in accordance with the ethical standards of the 1964 Declaration of Helsinki and its later amendments.

Informed consent

Informed consent was obtained from all participants in accordance with the research protocol approved by UT Southwestern's Institutional Review Board (STU 022012-009 Lee).

integrated provider network for preventive services in these rural counties, our tool facilitated a virtually integrated regional network to extend access to breast cancer screening to underserved women.

Keywords

evaluation design and research; access to care; service capacity; breast cancer screening

1. BACKGROUND

Rural counties are highly heterogeneous with respect to population size, public health infrastructure, and access to clinical providers, as well as more intangible dimensions of social integration and community capital. Public health programs can maximize their program's adoption, maintenance, and sustainability despite finite resources when providers gain the support and collaboration of local partners (Alexander, Weiner, Metzger, Shortell, Bazzoli, et al., 2003; Cassidy, Leviton, & Hunter, 2006; Shapiro, Thompson, & Calhoun, 2006). Understanding the capacity of potential program partners in rural counties to collaborate can be critical for the success of community public health service programs (Meyer, Davis, & Mays, 2012).

Non-profit organizations often fill gaps in rural services through problem-specific programs. When they succeed, this can create demand for them to expand their services or catchment areas, but meeting these demands can strain the non-profit's personnel and financial resources (Allard & Roth, 2010; Mangham & Hanson, 2010; "The Path to Scale: Ideas for Navigating Nonprofit Growth," 2013). Some organizations can scale up service provision within a program's original structure; for others, scaling up requires program redesign and partnering with other community groups to supplement resources and infrastructure (Mangham & Hanson, 2010; "The Path to Scale: Ideas for Navigating Nonprofit Growth," 2013). Research shows that non-profits tend to underestimate local community groups' competencies and capacities during scale up (Chambers, 1994), so funding agencies and donors increasingly push non-profits to conduct "needs assessments" characterizing potential partners, resources, barriers and facilitators in their service area (Cohen, McDaniel Jr, Crabtree, Ruhe, Weyer, et al., 2003; Davis, Balasubramanian, Waller, Miller, Green, et al., 2013; Leviton, Khan, Rog, Dawkins, & Cotton, 2010).

Most needs assessments, however, take a cross-section of a community's service delivery capacity, using only quantitative tools. This means, for example, reporting the number of mammography units available, hours of operation, types of providers practicing and types of insurance accepted (Peipins, Miller, Richards, Bobo, Liu, et al., 2012). Capacity, however, "affects not only the potential of organizations for uptake in the sense of adopting health interventions and entering into partnerships, but also the ways in which these are implemented in practice and whether they can be sustained" (Stockdale, Mendel, Jones, Arroyo, & Gilmore, 2006, p. S1:137). Deploying quantitative tools at a single point in time, as has been common, may miss important contextual factors relevant to program implementation.

To assess capacity adequately, service organizations require longitudinal, iterative assessment tools better able to capture the dynamic context and inevitable changes that influence a local partner's capacity to facilitate program adoption, implementation, and maintenance (Weiner, Belden, Bergmire, & Johnston, 2011; Scheirer, Hartling, & Hagerman, 2008). The rapid assessment process literature offered a more robust approach, by encouraging use of both qualitative and quantitative data. These "mixed-method" designs enable evaluators to account for changes in local settings and organizational context (Dick, Clarke, van Zyl, & Daniels, 2007; Jilcott, Ickes, Ammerman, & Myhre, 2010; Lee, Smith, Shwe Oo, Scharschmidt, Whichard, et al., 2009). Rapid assessment processes themselves are commonly iterative, both in sequence of methods and waves of data collection. Drawing on that literature, this paper describes the development and application of an iterative, mixed-method assessment tool to assess county capacity, operationalized as the ability and potential to conduct community outreach and/or patient navigation in this partnership model. We demonstrate how capacity designations shifted over the course of our assessment process, as a result of integrating qualitative and quantitative data.

1.1 BSPAN: A program to expand rural access to breast cancer screening procedures for the underserved

In 1990, Congress authorized the Centers for Disease Control and Prevention to administer the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) through state cooperative agreements to provide under- and uninsured women access to breast and cervical cancer screening and diagnostic evaluation procedures (Centers for Disease Control and Prevention, 2009a; National Breast and Cervical Cancer Early Detection Program (NBCCEDP), 2013). The Texas Department of State Health Services administers the Texas version of the program, called the Breast and Cervical Cancer Services (Texas Department of State Health Services, 2016). While NBCCEDP has improved screening rates and mortality among underserved women overall (Benard, Royalty, Saraiya, Rockwell, & Helsel, 2015; Centers for Disease Control and Prevention, 2009b; Ehemann, Benard, Blackman, Lawson, Anderson, et al., 2006; Hoerger, Ekwueme, Miller, Uzunangelov, Hall, et al., 2011), significant rural distances and low BCCS participation rates among providers in North Texas represent persistent obstacles for under- and uninsured women seeking screening services (Rajan, Begley, & Kim, 2014). In light of these needs, a nonprofit organization, Moncrief Cancer Institute in Fort Worth, TX, created the *Breast Screening & Patient Navigation* (BSPAN) program to develop a virtually integrated network of local providers across 5 rural, underserved counties (Argenbright, Anderson, Senter, & Lee, 2013). Leveraging its existing BCCS contract, BSPAN would reimburse these providers for clinical breast exams, screening mammography, diagnostic imaging, and biopsy, as appropriate. This "virtual integration," in contrast to vertically integrated systems of unified ownership of service providers (Robinson & Casalino, 1996) enabled Moncrief to coordinate clinical procedures by creating reciprocal contract agreements and a common clinical information system (Inrig, Tiro, Melhado, Argenbright, & Lee, 2014). Additionally, the BSPAN program: 1) created a multi-county outreach strategy to increase women's awareness of availability of fully-funded screening procedures, and 2) developed an oncology-certified nurse-driven patient navigation telephone hotline to connect patients to local providers or mobile mammography vans and to ensure women were able to complete the breast screening process and achieve

timely resolution of abnormal screening follow-up, as appropriate (Argenbright, Anderson, Senter, & Lee, 2013). In 2011, Moncrief sought to expand beyond the original 5 counties (“original”) to twelve adjacent rural counties (“expansion”), and enlisted our evaluation team to reach a total service area of 17 counties covering ~14,000 square miles (Figure 1) (Inrig, Tiro, Melhado, Argenbright, & Lee, 2014).

We proposed evolving BSPAN into a regional, de-centralized, “hub-and-spoke” delivery model (Authors, 2014) with Moncrief as the “hub,” and trained stakeholders in the “spokes” (county organizational partners). While the hub assessed resources and maintained centralized management of all reimbursement activities in the expanding network, the spokes conducted outreach and patient navigation locally, as determined by their capacity, and contracted with local provider organizations for clinical procedures, (see Figure 2). Expanding the program in this way would require rural county stakeholders to increase their engagement and participation. But which counties had the capacity to do this? How could Moncrief know which counties could sustain these increased levels of engagement? To establish this new partnership model, we worked with Moncrief to stagger the implementation strategy over time by county. We developed an iterative, mixed-method tool that Moncrief could deploy to assess each county’s capacity to conduct community outreach and patient navigation in our partnership model.

2. METHODS

2.1 County Partners

Capacity has both structural and process elements (Goodman, Steckler, & Alciati, 1997). We operationalized capacity as an organizational partner’s willingness to: (a) collaborate with other local organizations and the hub; (b) conduct specific program activities of community outreach, and/or patient navigation; and (c) adapt those activities to improve quality of care delivered, within the evolving BSPAN network (Hoerger, Ekwueme, Miller, Uzunangelov, Hall, et al., 2011; Stockdale, Mendel, Jones, Arroyo, & Gilmore, 2006). Potential partnerships, then, could entail one or both program roles: conducting clinical navigation, community outreach to promote awareness and access to screening procedures among local women. Clinical navigation of women across the screening continuum (see Figure 3) included: assessing of financial eligibility, scheduling clinical procedures, following women through diagnostic resolution, and connecting to treatment for women with positive biopsy results (Tosteson, Beaber, Tiro, Kim, McCarthy, et al., 2016). In practice, we used *High Capacity* to designate a county partner that could lead both navigation and outreach components of the BSPAN model; *Medium Capacity* to designate a counter partner only able to implement the outreach component; and *Low Capacity* to designate those county partners that needed the hub for both navigation and outreach (i.e., potential partners could not execute either component). Potential partners could be clinical entities (hospitals, clinics, individual physician practices, indigent medical programs), civic organizations (agriculture extension offices, churches, school districts, local businesses), or influential individuals (county judge, church pastor). For example, a local physician practice might implement the navigation component, while a church might take on outreach efforts.

2.2 Process tool for assessing county capacity

Our assessment process needed to draw on both quantitative and qualitative data collected at more than one time point to fully capture each dimension of capacity (collaboration, conduct, adaptation) and, thereby, adequately determine capacity designations: High, Medium, and Low. We developed our tool through “intensive, team-based qualitative inquiry using triangulation, iterative data analysis, and additional data collection to quickly develop a preliminary understanding of a situation” (Beebe, 2001: xv). We engaged the views, perspectives, and concerns of multiple stakeholders at the program hub (Moncrief) and across potential spokes (county partners) during extensive observation and interviews (Table 1). First, we surveyed the extant literature measuring breast cancer screening and health service delivery capacity. Second, we interviewed 8 staff members from the hub who played an instrumental role in designing and executing the original 5-county program. Third, we interviewed key stakeholders in 3 original and 3 expansion counties about their knowledge, perceptions, and experiences with the program (see Appendix A: Interview guide). Interviews lasted 45–60 minutes, over 1–2 sessions, enabling investigators to compare notes, follow up on themes raised by other interviewees, and conduct member-checking by recapitulating elements of the earlier interview to confirm and clarify. All interviews were audio-recorded and participants received a \$20 honorarium. We used these data to determine criteria and characteristics that hub staff considered necessary for a county partner to manage outreach and/or patient navigation components (Table 2).

During multiple site visits at the hub and potential community clinic partners, our study team shadowed various care team members (Monahan & Fisher 2010; see also Appendix B: Observation guide). As observations progressed, we tracked how local organization workflows could map to different components of Moncrief’s clinical navigation algorithm. When feasible, we clarified observations during opportunistic verbal exchanges with relevant program staff.

All audio-recorded and written field notes from site visits, audio-recorded interviews, and interview notes were professionally transcribed. Two evaluators conducted site visits and interviews (SJI, SCL) during tool development, while a third (RTH) conducted all site visits and interviews through expansion implementation; all three conducted data integration and analysis. To enhance investigator triangulation and reduce bias, hub staff did not participate in analysis but were routinely engaged in participant validation, i.e. member-checking (Thurmond 2001; Thurston, Cove, & Meadows 2008).

We conducted thematic analysis of interviews and site visit field notes (~1,000 pages) using NVivo 9.0 (QSR International, Australia). We used the breast cancer screening process model (Figure 3) to develop an initial deductive coding scheme mapping our data to different steps and interfaces (exchanges of information and responsibility) and program components (see Table 1). In an iterative coding process, we examined expressions and concepts to identify relationships and link phenomena in the process model. We met weekly to identify and interpret emergent themes, and inductively revise the coding schema accordingly, resolving discrepancies by consensus (Cohen & Crabtree 2008). Then, we presented a draft of the tool to the hub staff to ensure face and content validity, and assess their relative importance. We noted how hub staff communicated with county providers over

a period of months to build a trusting relationship before executing reimbursement contracts. Based on extant literature and our interviews with individuals from the hub, we concluded that assessment of county capacity had to follow a multi-step, mixed-method process (Figure 4).

This approach combined the benefits of rapidly acquired quantitative data with more nuanced data produced by ethnographic methods (Manganyi, Hartmann, Hildebrand, McGuire, & Russo, 2006; Shaner, Phillipp, & Schmehl, 1982). Our goal here was to allow stakeholder views and interests about their organization's and county's ability to contribute to the BSPAN program's success "in the real world" (Chen, 2010). The multi-step, mixed-method approach allowed stakeholders to participate in a "viability evaluation" to assess the extent to which their organization or their county could meaningfully contribute to BSPAN's effort to address breast cancer screening among uninsured and under-insured women in their county. Were the program goals practical, from their organization's perspective? Was the BSPAN program suitable to Moncrief's "capacity for implementation" (Chen, 2010)? How could it best survive in the community? Allowing the stakeholders to answer these questions not only provided invaluable data to the Hub about a county's capacity to implement the full program, but also foster hub staff and stakeholder consensus about accuracy of final capacity designation. Procedurally, such inclusion also reduced the possibility that spoke stakeholders might reject the intervention simply on grounds the hub had failed to identify or explore factors critical to the spoke perspective.

For Step 1, hub navigation and outreach program staff gathered information on breast cancer screening and health service delivery capabilities in each county from Internet-based resources (e.g. county government, healthcare organizations, and U.S. Census). This information determined the county's preliminary designation. In Step 2, hub staff assessed logistical and social characteristics of the county, through multiple site visits and interviews with potential county partners. Interviews were designed to document healthcare service infrastructure and social network structures on how local providers and community organizations worked with each other to share information and to deliver care to indigent populations. Hub staff also asked potential partners to complete an online organizational self-assessment survey (Harris, Taylor, Thielke, Payne, Gonzalez, et al., 2009). This self-assessment portion, called the "spoke RAC", posed both structured and semi-structured questions that allowed each stakeholder to assess the extent to which they felt their organization, as well as their county at large, could meaningfully engage in the BSPAN program. The questions ranged from whether the mammography unit (potential medical partner) felt they could provide screening mammograms within 15 work days to what their screening process was or whether the organization or county (potential non-medical partner) had a "cause champion" who could generate leadership to ensure local program success (see Appendix C). Lastly, hub staff combined all data collected in Steps 1 and 2 for review and group discussion, then collectively assigned a final capacity designation to implement outreach and patient navigation components. Hub program staff worked with those county partner organizations to ensure they understood the capacity assessment process and how determinations of capacity translated to specific tasks and responsibilities for program components. Based on the tool application process, hub and spoke members agreed on each organization's respective activities and responsibilities, i.e. what components could be

undertaken rather than those that could not, without specific reference to the labels, “high, medium, low”.

3. RESULTS

Our initial assessments of the 17 counties indicated a high level of heterogeneity across several rural county characteristics (Table 2). In addition to wide ranges in number of women >40 years of age, 14 counties contained no urbanized population while 3 contained some range of <50% population residing in urbanized areas; 7 of 17 counties were recognized federal Health Provider Shortage Areas. Only 2 counties had more than one hospital; among those with a single hospital, total number of beds ranged from 25–137. The county with the highest percent urbanized resident population and greatest number of women over 40 was also an outlier with respect to medical infrastructure: 4 hospitals (752 total beds), and 8 mammography facilities (1 contracted). Of those counties with >1 mammography facility (14/17), BSPAN successfully contracted with 12 of 22 possible facilities to expand the service network (Step 2).

Capacity designations changed for 10 of 17 counties between Steps 1 and 2 as a direct result of mixed-method data (semi-structured interviews, site visits, and surveys). Designation rose in 3 counties, while designation fell in 7 counties. Notably, 5 counties were initially designated High Capacity in Step 1; following Step 2, only 1 county remained High Capacity. Key factors influencing capacity included: (1) formal linkages between partner organizations; (2) inter-organizational history and local control; (3) existing protocols for care delivery; and (4) underserved populations. These factors were dynamic, reflected social networks of local organizations, and fluctuated over the course of assessment as well as after final designation during actual program implementation. The extent to which each factor affected capacity designation depended on context and setting. Below, we elaborate on the role of these four factors in affecting capacity and how such changes influenced plans for implementation through capacity designation.

3.1 Formal linkages: contractual versus ownership relationships

In one county, hub staff had to delay BSPAN implementation for 9 months because of problems executing reimbursement contracts with the local hospital whose staff had agreed to implement patient navigation. The local hospital had recently merged with a regional hospital system, which was already partnered with BSPAN in neighboring counties. Despite the hospital’s state-of-the-art mammography unit and qualified staff, interviews with hospital leaders indicated that transitions in governance and management following the merger had brought new concerns about BSPAN’s value. After the contract was signed, hub staff found that the nurses initially identified to serve as navigators no longer worked at the hospital. As a result, capacity designation was downgraded to Medium, where hospital administrative staff conducted outreach efforts while the hub retained patient navigation activities.

In another county, local hospital leadership was eager to adopt BSPAN over mobile mammography screening with their regional system. Leadership perceived that BSPAN would enable reimbursement to flow into the local hospital; whereas, if the hospital had

relied on the regional system's mobile vans, mammography service dollars would flow to the regional system. BSPAN was able to capitalize on such intra-health system disputes over resource allocation.

3.2 Inter-organizational history and local control

An additional challenge was perceived threats to local control by pre-existing local charities. Ideal BSPAN partners would be invested in the overall mission and wield influence over local stakeholders to help launch and implement the program; hub staff believed local charities would be ideal partners. In one county, hub staff wanted to partner with a well-established and highly visible local charity that facilitated access to screening procedures for under-resourced women. In addition, the charity had impressive fundraising. During Step 1, our assessment process suggested that the charity's reach would need to expand, particularly among racial and ethnic minority communities. While the program's reimbursement contract would cover expansion to new populations, those funds would flow directly to local clinical providers. However, subsequent interviews in Step 2 suggested the charity perceived the hub as a direct competitor because BSPAN: 1) enabled reimbursement contracts between the hub and local medical providers (bypassing the charity), and 2) would not operate under the charity's direct control. As a result, the hub was concerned about creating dissension in the community. Our fieldworker noted,

“A nonprofit ...who relies on their own networks to survive would be reluctant to partner ... [if they would] basically be working for free ... if they're not getting a cut of the funds that result in increased numbers of women screened. ... [That scenario] doesn't help accomplish any partnership of plugging [women] into any resources that [the charity] doesn't already have [its] hand on.”

Another key stakeholder agreed:

“If we're being squashed by [two large charities], I don't want to be squashed. We work real hard. ... When I fund a mobile unit, there are people that come on that unit that have insurance. I pay for everybody there and I never get reimbursed for anybody that has insurance. ... That happens a lot. So that's one reason. I mean we work hard at what we do and we know what we do but we're not here to do everybody else's work. ... if I'm gonna do it to make somebody else big or rich or have their own agenda, then I'm not doing it.”

3.3 Existing protocols for care delivery: “how things are done here”

Although a local radiologic facility, with a routine protocol to refer patients through the screening continuum (e.g., screening mammography to diagnostic evaluation if abnormal), might initially suggest capacity for navigation, existing care delivery protocols sometimes also contributed to provider reluctance for change. In one of the counties deemed High Capacity at Step 1, a potential hospital partner found BSPAN's internet-based navigation and reimbursement clinical information system to be redundant with their electronic medical record. While they served a significant proportion of the indigent population, the partner perceived itself to be too short-staffed to take on the required reporting for program adoption. Thus, hospital leadership had little motivation to adopt either navigation or

outreach. Lacking another clinical partner with navigation capacity in the county, the hub had to downgrade designation to Medium, retain responsibility for patient navigation at the hub and selected an alternate, non-clinical community organization to conduct outreach.

In another county designated as High in Step 1, the key clinical partner had an electronic medical record system and rudimentary patient navigation run by radiology. While this infrastructure and protocols did not cause the hub to downgrade capacity designation, redundancies between the local and BSPAN navigation protocols hampered efficient implementation (Browder, Eberth, Schooley, & Porter, 2015). As the local nurse navigator explained, “The way that the computer is set up now, it does not give us 6 month reminders ... [So] we send them a card, [but] I still keep a sheet of paper on each lady ... I’m not really connected with [Radiology]. I’m assuming they have sent cards out, but because I’m not 100% sure that those cards went out, I have a copy that I can call and say, “You know, it’s been a year since we’ve done your screening, it’s time to come back.”

3.4 Underserved populations

In one county, early attempts by BSPAN hub staff to facilitate collaboration among three local organizations stalled largely because the local hospital was not interested in expanding radiographic service to address breast care needs of new patients. (Wayland & Crowder, 2002) Expansion of access to clinical procedures to those unable to pay was not a priority for resource investment. As one doctor noted:

“Most people who [access care from the free clinic and avoid the hospital] ... have been people who have no insurance, probably owe every doctor and hospital here in town money. So they don’t go because they’re embarrassed over actually being chastised for being that way or, you know, they’re made to feel small. And [the free clinic] is the only thing they have. ... The doctors here in town ... they’re not taking new patients. ... They won’t take Medicaid. ... and they justify that by saying ‘we’re full.’ And they are. ... Why should they [partner with programs that reach the indigent]? [The for-profit hospital’s] margins are not that great, but they’ve got a very good hospital there, you know, a lot of great equipment and good docs and they can survive on the population that exists here. They don’t need a big drain on their resources. ... Why should they go elsewhere?”

In another county, we found two community clinics primarily providing charity or subsidized primary care to under- and uninsured women served a very different clientele than the local hospital (Wayland & Crowder, 2002). With local organizations unwilling to collaborate in navigating women from these clinics to the hospital, the hub designated the county as Low Capacity and navigated patients from the community clinic to a radiology facility in an adjacent county. Months later, an executive and a radiologist at the hospital championed restarting partnership discussions to implement BSPAN in their community. Hospital leadership had observed BSPAN’s success in adjacent counties, notably timely reimbursement and positive media coverage. They were now eager to “own” BSPAN activities in their county. Although the hub could not identify a nurse navigator, community organizations were willing to lead outreach, elevating county capacity designation to Medium. Following launch of BSPAN activities, county partners successfully worked with

the school district and Spanish-speaking church congregations to further increase awareness of the BSPAN program among local uninsured women.

4. DISCUSSION

In this study, we developed an iterative assessment tool integrating quantitative and qualitative data to determine county capacity to implement components of a de-centralized regional service delivery model (Farmer, Robinson, Elliott, & Eyles, 2006). Our data elucidate several factors that may cause actual capacity to change over time prior to final designation:

Challenges in formalizing linkages

Although outreach could be conducted by non-clinical personnel, execution of clinical procedure contracts often disproportionately affected when and how the BSPAN program could be launched in any given county. Formal linkages, like contracts, proved fundamental to the expanding network, but the timing and establishment of contracts often depended on circumstances beyond the control of BSPAN program staff.

Frequent changes in capacity

The healthcare sector is in constant flux; service delivery programs for indigent populations need to anticipate such change and accommodate potential impacts on the stability of virtually integrated networks. Unanticipated delays in contract completion or program component implementation may signal changes in actual capacity and therefore call for reassessment. Estimations of capacity must include functional capacity, as a key stakeholder may be unable to scale up beyond its existing operations despite perceived capacity to do so. Thus, several county partners initially appeared High Capacity on evidence of potential resources available. However, nuances of organizational context, documented through complementary evaluation activities, subsequently revealed that initial capacity designations would likely require re-assessment as in Step 2. For example, nursing staff at one community hospital reported interest and demonstrated qualifications to participate as navigators; however, we subsequently documented that management sometimes moved nursing staff across hospital sub-units with little advanced notice, which would disrupt continuity of navigation by trained partners and risk compromising service quality.

Community leaders and local priorities

Our iterative tool fostered the hub's ongoing relationship-building with local organizations. Even small partner organizations juggled countervailing forces in internal leadership dynamics, and we found meaningful variation in level of interest, willingness and motivation to partner, particularly among hierarchically structured organizations (Cleary, Gross, Zaslavsky, & Taplin, 2012). Leaders in rural communities, for various reasons, may resist adopting programs perceived as less relevant to their community priorities (Alexander, Christianson, Hearld, Hurley, & Scanlon, 2010) or redundant with existing services, limiting BSPAN's appeal.

Relationships among local organizations

Understanding social network characteristics among stakeholders and potential partners often facilitated determinations of county capacity (Merrill, Keeling, & Carley, 2010; Schensul, 2009). Perceived competition and local control are significant concerns, whether in rural communities or elsewhere (Chavis, 2001). Change in hospital ownership and the presence of pre-existing charities shaped formation of the BSPAN partner network. Prior studies suggest that, although “effective delivery... is premised on a high level of coordination between service providers, the pattern of interdependencies between providers limits the frequency and effectiveness of cooperation” (Powell, Thurston, & Bloyce, 2014: 561). Our implementation experience with this hub-and-spoke model demonstrates how “historically constituted social networks, within which providers are embedded” shape partnership development” (Ibid: 576). Our tool revealed that local organizations that feel competitive with the hub were likely to act as gatekeepers limiting programmatic impact.

Financial viability among clinical partners

Rural hospitals and providers often struggle to keep solvent, and the extent to which they are able to prioritize care for indigent populations varies (Smith, Mays, Felix, Tilford, Curran, et al., 2015). The time and investment associated with systematic outreach to under- and uninsured populations may have initially appeared cost-prohibitive, despite the benefits of the hub’s centralized reimbursement for clinical procedures. Program uptake also depended heavily on partners’ perception that the program fit within existing protocols for care delivery, both clinical information systems and revenue flow; we found organizational inertia was a common impediment (Feldman, 2000). Willingness to adopt the program repeatedly hinged on perceived benefit to the partner’s financial or social capital (Butterfoss, Goodman, & Wandersman, 1993). For example, hospital leaders were influenced by factors such as the reputation of the hub and the strength of its existing relationships with partners in adjacent counties. Clinical stakeholders, in particular, agreed to partner more for short-term, pragmatic reasons, rather than longer-term, strategic reasons like increasing their patient base; altruistic arguments (e.g. serving the under-insured) were neither necessary nor sufficient beyond initial overtures (Alexander, Christianson, Hearld, Hurley, & Scanlon, 2010).

Changes in healthcare funding policy

The ability of programs like BSPAN to adapt to shifts in the funding environment while efficiently navigating women through the screening continuum remains an important contribution to rural cancer prevention (Lantz, Richardson, Sever, Macklem, Hare, et al., 2000). Many healthcare markets are moving toward greater provider integration and regional consolidation (Christianson, Carlin, & Warrick, 2014; Cunningham, Felland, & Stark, 2012). Accountable Care Organizations have emerged as a virtually integrated alternative to regional systems (Cunningham, Felland, & Stark, 2012; Neuhausen, Grumbach, Bazemore, & Phillips, 2012), but they are often designed to address shared risk by focusing on *insured* populations (Hacker, Santos, Thompson, Stout, Bearse, et al., 2014; Hall, 2013). It is unclear how payor reforms or other changes to the healthcare landscape will impact virtual provider networks formed by programs, like BSPAN, that contract with local organizations to provide

access to clinical procedures for uninsured populations. For example, joining a regional healthcare provider system can provide economies of scale, thereby, keeping previously independent facilities solvent. This could be critical strategy at a time when many rural hospitals – 11 in Texas since 2010 – face cost challenges due to rural demographics, Medicaid budget cuts imposed through federal sequestration, and Medicaid expansion policies implemented by ACA legislation (Cecil G. Sheps Center for Health Services Research, 2015).

Such federal healthcare policy changes, and resulting state-level responses, could present new fiscal challenges to the sustainability of the BPSAN program model and others like it. Currently, the Texas NBCCEDP program reimburses for breast cancer screening procedures at Medicare rates. BCCS contractors, therefore, receive relatively robust reimbursement for these preventive procedures. Further, Moncrief's program directly passes that reimbursement rate on to BSPAN clinical network partners. While program dependence on BCCS results in reimbursement that may have facilitated program adoption, it could serve as an obstacle to program sustainability were Texas to expand Medicaid as part of evolving ACA provisions; this could possibly shift reimbursement, in effect, to Medicaid levels. In that context, then, programs like BSPAN might struggle to secure local provider participation in their network, as many providers consider Medicaid reimbursement inadequate to cover operational expenses of providing clinical procedures for underserved women. Future research should monitor how such healthcare developments may impact rural regions and affect delivery of care to indigent populations (Allen, Ballweg, Cosgrove, Engle, Robinson, et al., 2013; Kaufman, Reiter, Pink, & Holmes, 2016).

Limitations

Our study has several limitations that temper our ability to generalize findings to other underserved, rural contexts. First, it is possible that quantitative data captured in Step 1 were not sufficiently comprehensive, which may be why capacity designation changed after consideration of additional qualitative information. While Step 1 was guided by the peer-reviewed literature, the paucity of information available may itself reflect lack of health service infrastructure in rural areas.

Second, Moncrief's prior success reflected their organizational commitment to ensuring access to screening procedures for underserved women, often compensating for partner shortfalls. Fidelity is an often cited barrier in the implementation literature (Chambers, Glasgow, & Stange, 2013), in part because implementing organizations find it difficult to risk drops in quality for the sake of testing a prescribed expansion plan. Focused on assessing spoke partners, our evaluation approach was premised on Moncrief's confidence in its own capacity to serve as the hub throughout the expansion and did not fully attend to the implications of the hub providing everything that all county spokes did not take on.

Third, policy decisions at the state and federal level may have affected both capacity assessment and motivation of community organizations to participate in BSPAN. For example, Texas has the highest rates of uninsurance in the nation, restrictive Medicaid eligibility limits, and has not expanded Medicaid to indigent populations as part of the Patient Protection and Affordable Care Act (ACA) (Buettgens, Holahan, & Recht, 2015;

Kaiser Family Foundation, 2015a, 2015b, 2015c; Sommers, Maylone, Nguyen, Blendon, & Epstein, 2015). Nationally, the NBCCEDP program has not treated outreach activities as a reimbursable clinical service and BSPAN was unable to provide monetary incentives for outreach activities. Thus, participation in the program expansion was skewed towards those partners who perceived adopted program components to be consistent with their existing priorities, local resources, and relationships (Hogg, Mays, & Mamaril, 2015). Service delivery programs able to support outreach partners financially may see stronger response among more diverse potential partners.

Fourth, the Hub approached potential partner and community stakeholder recruitment strategically but, therefore, often with a snowball or convenience manner. The hub staff inclination was to target stakeholders that “made the most sense” before moving on to lower profile or less accessible prospects. This may have introduced selection bias that, when translated into measuring county capacity, did not reflect accurately the full potential or diversity of potential partners within a given county. Conversely, bias may also have been introduced in other counties where few providers or community organizations existed, making a comprehensive recruitment effort much easier.

Fifth, although we separated capacity data collection from our evaluation data collection, the evaluation team’s close relationship with the hub may have impacted objectivity and obscured the hub’s true ability to deploy the iterative capacity assessment tool.

5. LESSONS LEARNED

Our experience has important implications for development, implementation, and evaluation of decentralized programs in rural communities where service delivery through a virtually integrated network requires collaboration across multiple stakeholders.

Staggered implementation is advantageous

Staggering implementation over time enabled BSPAN to expand on multiple fronts so that the hub could capitalize on a confluence of changes in hospital leadership in one county then leverage demonstrable success in neighboring counties when BSPAN re-introduced the program to new hospital decision-makers. Success in early-adopting counties positively influenced program uptake in others initially reticent to partner. Such lead-in time proved beneficial not only in demonstrating program success, but also underscoring the hub’s commitment to local needs and willingness to partner rather than to compete with local organizations.

Iterative evaluation of both hub and spokes is critical

Capacity is a multi-dimensional construct. Iterative assessments are required to capture changes in county capacity over time. Hub-and-spoke model evaluations require equal attention to both the capacity of the hub itself to expand as well as the capacity of spoke county partners to adopt program components. Our evaluation leaves unexamined questions about the type of systemic changes in procedure, staffing, oversight and accountability that may be needed for an originating organization to evolve into a hub serving multiple spokes with different service capacities.

Financial considerations outweighed cause- or community-oriented motivations among clinical providers

A key concern among potential clinical partners was whether they would recuperate at least comparable administrative costs if they expanded access to clinical procedures to vulnerable women. Hub incentives - new reimbursement streams via new contracts, increased public visibility of the organization – did not outweigh partner concerns about whether systematic outreach to indigent patients for breast cancer screening would increase financial demands on the facility. As our model lacked financial incentives for the spoke partners beyond clinical procedure reimbursement, the hub had no mechanism to compel participation from providers unconvinced that reimbursement over the longer-term would counterbalance perceived short-term outlays.

6. CONCLUSIONS

County capacity is a multi-dimensional construct that can be influenced by multiple factors over time. An iterative, mixed-method tool improved assessment of county capacity and allowed the program hub to optimize program implementation through an expanded network of county partners.

Generalizability of our rural capacity assessment tool should be tested in other states with different insurance environments as states have responded differently to efforts at Medicaid expansion and the establishment of healthcare exchanges. Given variation in the size and needs of uninsured populations, it will be important to compare our findings with similar programs outside of North Texas.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations

NBCCEDP National Breast and Cervical Cancer Early Detection Program

BSPAN Breast Screening and Patient Navigation program

ACA Patient Protection and Affordable Care Act

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Figure 1.
BSPAN Program Service Area

Figure 2.
BSPAN Program Logic Model

Figure 3.
Breast Cancer Screening Process Model

Figure 4.
County Capacity Assessment Process

Table 1

Qualitative Evaluation Activities

County	Partner Organizations					Partner Individuals		
	# medical	# non-medical	# site visits	total # orgs contacted	brief contact	phone interview	in-person interview	total # persons contacted
Expansion #1	2	5	6	7	2	1	6	9
Original #1	4	4	5	8	6	1	7	14
Original #2	5	4	7	9	4	5	6	15
Expansion #2	5	6	9	11	1	3	11	15
Original #3	3	8	8	11	4	2	6	12
Expansion #3	3	2	4	5	1	2	5	8
6 total research counties	22	29	39	51	18	14	41	73
Non-research counties	2	0	1	2	0	9	0	9
All counties	24	29	40	53	18	23	41	82

Table 2

Thresholds for High, Medium, and Low Capacity at Steps 1 and 2

High Capacity (Spoke-led outreach & navigation)	Medium Capacity (Spoke-led outreach, hub-led navigation)	Low Capacity (Hub-led outreach & navigation)
NAVIGATION		
At least one mammography unit	Some clinical components, but no one to coordinate them	Some of the clinical components but no one to coordinate them.
At least one qualified provider who can read films on site		
Capacity for expedited clinical procedures and mammography delivery		
At least one oncology-certified mid-level provider (e.g. NP, PA, RN) able to supervise patient navigation		
At least one breast surgeon		
At least one provider who can conduct biopsies		
At least one provider who can conduct Clinical Breast Exams		
Ability to conduct navigation documentation using program database	OUTREACH	Ability to conduct some of the outreach components but no one to coordinate them.
A locally-knowledgeable clinical provider able to serve as navigation "point of contact" for hub, to coordinate patient scheduling and access to clinical procedures *		
Ability to implement an outreach strategy to local media, community events, and connect with organizations serving low-income and/or uninsured women.		
A locally-knowledgeable champion able to serve as outreach "point of contact" for hub, to coordinate relationships with local partners and organize outreach events *		
Ability to conduct outreach documentation		
Significant buy-in and support from county stakeholders *	Moderate buy-in or support from county stakeholders *	Low level buy-in or support from county stakeholders

* Applies to Step 2 only.

Table 3

Rural County Characteristics (Step 1) by Final Capacity Designation (Step 2)

County	Step 1						Step 2		
	# Women age>40 ^a	% Population Residing in Urbanized Areas ^b	HPSA ^c	# Hospitals (# Beds) ^d	# Mammog. Facilities Available ^e	Initial Capacity	# Mammog. Facility Contracts	Final Capacity	Change in Capacity
County 1	162,465	80–100%	no	4 (752)	8	high	1	medium	down
County 2	38,966	20–49%	no	1 (137)	1	low	0	low	same
County 3	33,821	1–19%	no	1 (103)	2	medium	1	low	down
County 4	16,696	none	no	1 (83)	1	high	1	medium	down
County 5	16,103	none	YES	1 (133)	1	low	0	low	same
County 6	10,345	none	no	1 (60)	1	high	1	medium	down
County 7	9,922	none	YES	1 (116)	1	high	1	medium	down
County 8	8,300	none	no	1 (98)	1	medium	1	low	down
County 9	7,868	none	YES	1 (42)	1	low	1	medium	up
County 10	5,580	none	YES	1 (33)	1	low	1	low	same
County 11	5,215	none	YES	1 (42)	1	high	1	high	same
County 12	4,367	none	no	2 (69)	0	low	0	low	same
County 13	3,977	none	no	1 (25)	1	low	1	medium	up
County 14	3,223	none	YES	1 (25)	0	low	0	low	same
County 15	2,589	none	no	1 (42)	1	medium	1	low	down
County 16	2,462	none	no	1 (134)	1	low	1	low	same
County 17	2,212	none	YES	1 (41)	0	low	0	medium	up

^aUS Census, ACS 2009–13, by Sex and Age^bUS Census Bureau, 2010 Urban Area Delineation Program. “None” is used as shorthand here for the report’s designation of “no urbanized population”^cHealth Provider Shortage Area, US Health Resources Services Administration^dU.S. News & World Report, 2014–15; Texas Department of State Health Services, 2008.^eAmerican College of Radiology