Practice-based research networks (PBRNs) have been in existence for several decades, and they provide one mechanism to conduct research outside of academic research centers. Two transformative changes to the practice environment pose significant challenges to the manner in which PBRNs have functioned in the past and require changes to their current activities. The widespread introduction of electronic health records and the organization of practices into often hospital-dominated integrated delivery systems change the manner in which medicine is practiced, administered, and financed. Research funders are committed to extending research into communities, although we have yet to learn how to conduct these activities efficiently. We describe a number of operational challenges to this transformation, and we also propose ways to address these challenges and improve the quality and efficiency through which research is conducted. PBRNs can ensure their relevance in the research environment by adapting to this new era. (J Am Board Fam Med 2015;28:658–662.)

Keywords: Electronic Medical Records, Practice-based Research

Practice-based research networks (PBRNs) have been used for over a quarter century to conduct research on processes and outcomes of care in community practices. Clinicians, researchers, and funders such as the National Institutes of Health (NIH) and the Agency for Healthcare Research and Quality recognize that PBRNs may be the best way to examine patterns of care in generalizable practices. In addition, patients seeking care in community practices differ from those seen in tertiary care settings in important ways. They may have fewer comorbidities, may be more likely to be from racial and ethnic minorities, and be more geographically diverse. In the past several years both the NIH and the Patient Centered Outcomes Research Institute have prioritized pragmatic clinical trials as an efficient method to conduct comparative effectiveness research in generalizable populations. These pragmatic trials seem ideally suited to PBRNs because they minimally disrupt the functioning of the clinical care setting. Such trials also focus on collection of data, when feasible, from the practice’s electronic health record.

Historically, PBRNs have been moderate in size (50 to 150 practices) and have been characterized by their heterogeneity. Many involve both academic and community practices, and they frequently involve safety net practices such as community health centers. Study methods, originally observational, have broadened to include intervention studies. In the past much data collection involved chart abstraction, collection of primary data from patient reports, and assembly of limited data from aggregated claims or electronic health information. The use of these ag-
organsations are increasingly employing providers
health center care systems, and some provider-led
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tenance organizations such as the Kaiser Permanente
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zations, employing salaried providers, are now no
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structure and governance of these systems is forma-
ted health care delivery systems, or they may be
mulated, and likely to change over time.12 These organi-
zations, employing salaried providers, are now no
longer solely the province of staff model health main-
tenance organizations such as the Kaiser Permanente
system. Community hospitals, extended academic
health center care systems, and some provider-led
organizations are increasingly employing providers
and/or managing their practices.13 In the past, dis-
cussions with practices regarding participation in a
given research project generally involved the lead
physician(s) and the practice manager. When a prac-
tice is owned or managed by an IDS, the dis-
cussions become more complex, with involvement
by an administrator from the parent organization
who may or may not consider research to be part of
the system’s organizational mission. In addition,
research projects may be perceived as competing
with clinical revenue-generating missions and in-
ternal and external quality improvement initiatives.
These changes in the health care delivery environ-
ment pose a challenge to current PBRNs. To fulfill
their missions to improve care through engaged
research, they need to adapt to this changed deliv-
ery system. Our views in this article reflect our
experience with a large PBRN in North Carolina
and our experience with the national NIH-spon-
sored Clinical and Translational Science Award
consortium conducting practice-based research and
pragmatic trials.

These 2 changes in the organization and deliv-
ery of primary care are linked in some ways. Choice
and management of EHRs is complex, and many
practices are challenged by the complexity of sys-
tem choice and installation, as well as by the modi-
fications in team roles, organization, and workflows
required by meaningful use health information tech-
nology criteria. Large IDSs can assist with these
issues, and they can also decrease EHR installa-
tion costs and management through their economies
of scale. What are the implications of this increasingly
organized and corporate approach to care delivery
for PBRNs? Like most transformational changes,
some of the implications are positive and others
necessitate changes in PBRN management.

PBRNs are not static; even practices in long-
standing networks may move in and out of a net-
work, and practices may merge or change leader-
ship. In addition, practices appropriately pick and
choose which studies they want to participate in.
Reasons why a practice may opt in or out of a given
project include personal and professional interest,
number of ongoing studies, and competing activi-
ties such as computer upgrades, staff turnover or
patient-centered medical home certifications. With
the rise of research studies designed specifically for
single EHRs, some practices even within PBRNs
may be ineligible simply because of the inability of
their EHR to configure a specific prompt or order,
or to export certain information. PBRNs have varying internal policies for committing to research, but in the past planning discussions were generally with the lead practice physician and the practice manager regarding the topics, logistics, and financing of a given project.

When practices are owned or managed by a health care system, the system generally employs an administrator, often at a vice president level, over all the owned or managed practices. The administrator may or may not be a physician. The IDS may then become the entity with which subcontracts are conducted. To conduct system-wide quality improvement and population health management, delivery systems often flow their electronic health record data into a clinical data warehouse, which transforms EHR data into a searchable, analyzable database. These data aggregations facilitate quality improvement work and research, allowing analyses and data transfer from dozens of practices. Data warehouses are, of course, much simpler if all the component practices use the same electronic health record, and they are evolving in their governance policies regarding data access and use for research. The researcher, however, is then tasked with convincing yet another administrator or committee of the worth of the project, although a single point of approval may add significant efficiency in terms of enhanced sample size and generalizability.

Factors such as integrated ownership and clinical data harmonized and aggregated within a data warehouse are likely to facilitate PBRN activities in several ways if the practices are all within a single IDS. The unified administrative structure of the IDS can simplify contracting and enhance the consistency of interventions. However, potential problems may include the complexity of decision making when more levels of bureaucracy are involved, and employed providers may feel increased productivity pressure. Even “light touch” research in the office may be perceived by administrators as distracting from productivity goals often measured in relative value units delivered. PBRNs need to modify their organization and their processes in this new environment, and our goal is to stimulate discussion regarding these issues. Table 1 specifies some of the challenges and potential solutions in this new era of PBRN management. Some of these changes will be positive for the conduct of community-based observational research and pragmatic trials, but other challenges may interfere with the goals of the PBRNs.

**Promoting PBRN Survival**

How can the research community accentuate the positives and minimize the negatives of this accelerating process? Maintaining and expanding robust clinical, quality improvement, and health services research with diverse practices and populations will take active effort on the part of researchers, clinicians, and administrators, as well as the active support of funders including the Agency for Healthcare Research and Quality, NIH, and Patient Centered Outcomes Research Institute.

Some practices, particularly federally qualified health centers and small rural practices that care for underserved populations, may remain unaffiliated with IDSs because of geography and/or programmatic funding and goals. Preserving the research mission in these practices will likely require alignment of support services with research in a manner that helps these chronically stressed organizations achieve some of their educational and patient care goals. For example, an agriculture extension model providing shared services for multiple rural practices would not only serve as a hub for research activity but could provide practice consultation regarding quality improvement and redesign activities. Such services could include continuing education including Maintenance of Certification credit for physicians and routine continuing education for nurses and other staff, EHR and data analytic support, patient education (in person and electronically), virtual monitoring, and other services in the mobile or Internet-based health care arena. Maintenance of Certification IV and continuing education could provide desirable incentives. Dissemination and implementation science for the “learning health system” can rapidly spread comparative effectiveness findings and organizational priorities.

For practices that become owned or affiliated with large IDSs, the need for alignment remains, but the target then encompasses system goals in addition to those of individual practices. PBRNs need to leverage IDS informatics and administrative processes, when feasible, to enhance research efficiency and align organizational goals when possible. When an IDS has its own quality improvement or internal research organization, the PBRN
Table 1. Challenges and Potential Solutions to Practice-Based Research Network Research Missions in the Changed Practice Environment of Integrated Delivery Systems and Electronic Health Records

<table>
<thead>
<tr>
<th>Activity IDS Supports</th>
<th>IDS Challenges for Research</th>
<th>PBRN Solutions and Strategies</th>
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<tbody>
<tr>
<td>Provides consistent administrative policies for research participation across practices</td>
<td>Presence of an additional bureaucratic layer that requires negotiation (eg, need for subcontracts vs simple invoicing)</td>
<td>Develop standard governance agreements to share data across systems (eg, business agreements)</td>
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<td>Clinical initiatives can align with practice-based research questions (eg, meaningful use, patient-centered home certification, maintenance of certification)</td>
<td>Practice interest is lessened because of pressure from the IDS to maximize their clinical output</td>
<td>Build grant budget justification to compensate practice expenses incurred</td>
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<td>Priorities may support a philosophy of rapid dissemination and implementation</td>
<td>Practices at the IDS geographic periphery suffer neglect regarding system integration, support of usual services, and administrative consideration of projects not related to the system as a whole</td>
<td>Package research with practice support services (eg, EHR support, patient education, mHealth, practice facilitation, purchase and maintenance of data mapping/ harmonization products)</td>
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<td>Increased interest in research from the IDS through the lens of a “learning health care organization”</td>
<td>Adjacent IDSs may compete with each other for clinical market share; this competition could potentially have the unintended effect of reducing collaboration on research projects</td>
<td>Engage patients and other stakeholders with the idea of existing in a continuously learning health system and how all may benefit from this approach</td>
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<td>IDSs may be in direct competition with PBRNs; may not see the worth of PBRN work when they are already connected and have data</td>
<td>Engage providers and staff in publications, presentations, and pursuit of better outcomes for patients based on sound science</td>
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<td>Initially avoid topics that might be “hot buttons” for administrators</td>
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<td>Look for win–win grants and contracts that require collaboration with multiple systems; PBRNs bring a primary care focus and insight, and IDSs bring a hospital focus</td>
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<td>EHR and data warehouse</td>
<td>Allows data collection and analysis consistency.</td>
<td>Harmonize diagnostic, test, treatment, and utilization variables and codes across IDSs, including community health centers</td>
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<td>Reduced presence of safety net practices, since community health centers may not be part of the IDS and use a different EMR; this risks reducing the presence of participants with low socioeconomic status and minorities in research</td>
<td>Standardization of interoperability methods (data transfer among EHR systems) across IDSs</td>
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<td>Fragmentation of safety net clinic PBRNs as unique entities that are not included in studies that include other practice types</td>
<td>Ensure the ability of commercial EHRs to provide prompts to enroll patients in studies, as well as adjust the care process through order sets and targeted and evidence-based educational materials</td>
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<td>Limited staff availability, even with funding, to program EMR modifications or extract data from CDW</td>
<td>Budget programmer time for all projects</td>
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<td>Lack of responsiveness to providing requested data in a timely fashion</td>
<td>Joint governance of data warehouse by care delivery and academic components of IDS</td>
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<td>May be reactive to external forces, may inhibit innovative solutions</td>
<td>Can test novel interventions in practices that are early adopters</td>
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<td>Consistent roll out of quality improvement and regulatory practice enhancements</td>
<td>External grant funds may partially support such innovation.</td>
</tr>
</tbody>
</table>

CDW, clinical data warehouse; EHR, electronic health record; EMR, electronic medical record; IDS, integrated delivery system; PBRN, practice-based research network.
needs to be fully engaged with these endeavors. In-kind assistance to IDS administrators may be useful, although a time commitment. The IDS can learn from the often-years-long relationship the PBRN has with practitioners and their communities, potentially enhancing the adoption of quality improvement initiatives. Avoiding controversial “hot button” topics until the organizations have developed good working relationships may be appropriate. The PBRN’s research and quality improvement experience can then benefit the functioning of the IDS. A particular challenge will occur when a current PBRN incorporates practices from more than 1 IDS. For some projects, the PBRN practices may need to be stratified by IDS to avoid administrative problems and the perception of interfering with clinical competition.

To continue their mission, PBRNs must adapt to the changing reality of practice organization and delivery. The recommendations above involve engaging the practice community, IDSs, and funders. However, equally important is the demonstration of the value of PBRNs to the IDSs. The experience of PBRNs in the rapid planning and execution of research and quality improvement, and their collaboration across sites, will provide needed infrastructure to those learning delivery systems. Critical as well will be collaboration across IDSs to achieve sample sizes necessary for research, and well as to assess the applicability of delivery system interventions across sites. We need much more information regarding how these very large IDSs implement evidence-based care, and PBRNs can be an important component in evaluating and improving this increasingly important component of the US delivery system.

References