

Importance of Mixed Methods in Pragmatic Trials and Dissemination and Implementation Research

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ABSTRACT

With increased attention to the importance of translating research to clinical practice and policy, recent years have seen a proliferation of particular types of research, including pragmatic trials and dissemination and implementation research. Such research seeks to understand how and why interventions function in real-world settings, as opposed to highly controlled settings involving conditions not likely to be repeated outside the research study. Because understanding the context in which interventions are implemented is imperative for effective pragmatic trials and dissemination and implementation research, the use of mixed methods is critical to understanding trial results and the success or failure of implementation efforts. This article discusses a number of dimensions of mixed methods research, utilizing at least one qualitative method and at least one quantitative method, that may be helpful when designing projects or preparing grant proposals. Although the strengths and emphases of qualitative and quantitative approaches differ substantially, methods may be combined in a variety of ways to achieve

a deeper level of understanding than can be achieved by one method alone. However, researchers must understand when and how to integrate the data as well as the appropriate order, priority, and purpose of each method. The ability to demonstrate an understanding of the rationale for and benefits of mixed methods research is increasingly important in today's competitive funding environment, and many funding agencies now expect applicants to include mixed methods in proposals. The increasing demand for mixed methods research necessitates broader methodological training and deepened collaboration between medical, clinical, and social scientists. Although a number of challenges to conducting and disseminating mixed methods research remain, the potential for insight generated by such work is substantial.

KEYWORDS: implementation research; mixed methods; pragmatic trials; qualitative; quantitative

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In this issue we highlight the importance of mixed methods research with a Perspectives article as well as 2 articles (Glanz et al and Tschudy et al) that use mixed methods.

A number of new labels have sprung up in recent years to more specifically characterize research that in the past was often classified under the broad umbrellas of health services or outcomes research. Some of these terms, including “pragmatic trials” and “dissemination and implementation science,” reflect a recent focus on increasing the relevance of research to clinical practice and policy in an effort to improve health and health equity.^{1,2} These areas of research are now being specifically targeted in requests for proposals by health-related funding agencies, indicating their increasing importance to policy makers. Pragmatic trials, also called effectiveness trials or real-world trials, are specifically designed to determine the effects of an intervention under the usual conditions in which it will be applied, as opposed to the highly controlled conditions of a classical efficacy trial.³ Because of the relative newness of dissemination and implementation research in health and because of its development within a variety of different nonhealth disciplines, there is still

considerable variation in how it is defined within the field of health care.⁴ For the purposes of this article, implementation research is defined as consisting of “scientific investigations that support movement of evidence-based, effective health care approaches from the clinical knowledge base into routine use.”⁵ Dissemination research, as defined by the National Institutes of Health, is the “targeted distribution of information and intervention materials to a specific public health or clinical practice audience.”¹ Others have added to this definition the need for the process to be active, rather than passive, in order to differentiate it from diffusion.^{4,6}

This article focuses on the importance of mixed methods in conducting pragmatic trials and in dissemination and implementation research. We have chosen to focus on these areas because we believe that utilizing mixed methodologies has particular importance for these types of research. We first make the case for the importance of mixed methods in pragmatic trials and dissemination and implementation research, then summarize the role mixed methods has played in past pediatric health services and outcomes research. We then discuss a number of aspects of mixed methods research that may be helpful to

researchers designing projects. In addition to discussing the different strengths of qualitative and quantitative data and the ways in which the 2 types may be effectively integrated, we describe 3 dimensions of methodological combination and 5 specific mixed methods designs with particular relevance for dissemination and implementation research. We then provide suggestions for researchers interested in preparing grant proposals using mixed methods, identify a number of barriers to using mixed methods approaches, offer suggestions and strategies for publishing mixed methods research, and discuss implications for research training and collaboration.

WHY ARE MIXED METHODS SO CRITICAL?

Both pragmatic trials and dissemination and implementation research rely heavily on the context in which an intervention is being implemented and tested. As others have noted, successful dissemination and implementation involves making the intervention context sensitive without losing fidelity to its core components.⁷ What succeeds in one context or setting may fail in another. Without an understanding of the *why* behind success or failure, the effect of context cannot be understood. The use of mixed methods, involving both qualitative and quantitative approaches, thus plays a critical role in the understanding of pragmatic trial results and implementation efforts. An example in the area of immunization delivery may be instructive. Although there have been numerous trials demonstrating the effectiveness of reminder/recall conducted by practices for increasing immunization rates, national data indicate that reminder/recall is rarely used in clinical practice. The combination of qualitative and quantitative data has been key to understanding this mismatch between the evidence and what is actually being implemented in practice. A recent implementation study with a qualitative component confirmed that even when practices currently using a state immunization information service were offered training and technical assistance with reminder/recall, few practices actually followed through with conducting reminder/recall.⁸ The qualitative data, gathered through interviews with providers, uncovered many real-world barriers to effectively conducting reminder/recall, including insufficient staff time, competing demands of primary care, staff turnover, costs related to mailings or telephone call reminders, and the lack of computerized systems to aid in reminder/recall efforts. Such data have led our study team to consider alternative approaches to reminder/recall, including those involving centralized approaches that put less burden on individual practices.⁹

As the above example suggests, the use of multiple methods, and specifically the use of at least one quantitative method with at least one qualitative method, typically provides better traction and insight into a topic of interest than does the use of only one method alone. Further, the tensions between quantitative methods' values and processes and qualitative methods' values and processes can themselves lead to new insights.¹⁰ One common way of combining methods is to use quantitative data to study

outcomes and qualitative data to study processes. Methods have also been combined in order to conduct exploratory and confirmatory research; for instance, a researcher might first employ a qualitative method in order to explore a phenomenon and generate a relevant conceptual model and hypotheses, and then use a quantitative method to test the hypotheses in order to confirm the validity of the model.¹¹ A mixed methods approach can also help to compensate for the constraints of one set of methods. For example, a common problem in implementation research is the limited statistical power that may result from studying nested teams of service providers.^{12,13} In such a case, obtaining analytic depth within the nested teams through the utilization of a qualitative approach may help to lessen or reframe the quantitative limitations. Mixed methods can also allow examination of both the content and context of an intervention, with quantitative methods typically used to measure aspects of the content and qualitative methods typically used to understand the context. Understanding the context of a specific intervention's implementation is crucial because the settings in which implementation research occurs are complex and likely to vary significantly.¹³

Although the fields of health services and outcomes research have seen an increase in studies using mixed methods in recent years, there are currently still too few studies to help researchers interpret and understand the significant heterogeneity of trial results.¹⁴ A recent review found that of the 1651 empirical articles published between 2003 and 2007 in 4 top-ranked health services journals, only 47 used mixed methods.¹⁵ Similarly, only 5 of 110 articles published in the first 2 years (2003–2005) of the journal *Annals of Family Medicine* used mixed methods.¹⁶ Although small, such numbers nevertheless represent a notable improvement in attention to mixed methods, and this attention continues to increase. In recent years, a number of studies have used mixed methods with pediatric populations, including studies on autism,¹⁷ asthma,¹⁸ cancer,¹⁹ chronic fatigue syndrome,²⁰ depression,²¹ kidney conditions,²² spinal cord injury,²³ and teen pregnancy.²⁴ However, despite the growing number of research studies employing mixed methods with pediatric and/or adult populations, reporting of the key methodological components remains uneven. In particular, the description and results of the qualitative methods used has varied significantly.¹⁵ A recent review found that although 17% of articles describing trials of lay health worker interventions included qualitative methods, their description was often sparse.¹⁴

DESIGNING MIXED METHODS RESEARCH

The strengths and emphases of qualitative and quantitative approaches differ substantially, as do the purposes for which they are best used. Qualitative methods are particularly well suited to addressing aspects of a topic that are intensive and nonlinear, and/or that may require interaction for fullest understanding, such as in the study of processes relevant to dissemination and/or implementation. Studying process requires deep and careful observation of dynamic

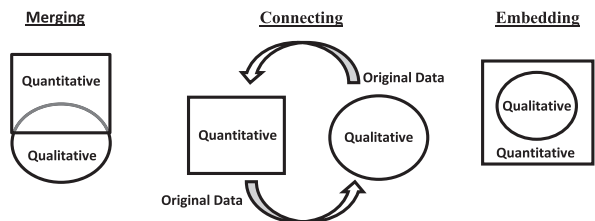


Figure. Integration processes for quantitative and qualitative data.

patterns of engagement²⁵ so that not only the nuances in but also the meaning behind the patterns emerge. Such depth of understanding cannot be adequately captured by, for example, studying responses to a single rating scale at a single moment in time²⁵ or through secondary analyses of an existing database. Because qualitative work involves an inductive, subjective, contextual approach,¹⁰ it is particularly useful when there is a need to elicit the perspectives, values, and opinions of stakeholders, participants, or consumers in their own words.²⁶ Qualitative approaches are also useful when seeking to understand why evidence-based practices were successfully or unsuccessfully implemented, or when seeking to identify strategies for facilitating implementation.²⁷ In contrast, quantitative methods emphasize a deductive, objective, generalizing approach¹⁰ and are typically best used in the measurement of intervention and/or implementation outcomes.²⁷ Quantitative approaches involve testing and confirming hypotheses based on an existing conceptual model and then obtaining a breadth, rather than a depth, of understanding of the predictors of successful implementation.²⁷

METHODOLOGICAL INTEGRATION

Given the very different strengths of the 2 types of approaches, the key to strong mixed methods research lies in the effective integration of the methods used. Combining and capitalizing on the strengths of both qualitative and quantitative methodologies within a single research study allows researchers to increase both the breadth and the depth of understanding.¹⁵ However, effective integration requires more than simply collecting and then reporting the results of quantitative and qualitative data; the different types of data must be mixed at some stage of the research process in order to generate new knowledge.²⁸ Further, researchers must be clear about the implications of their choices regarding the nature and timing of the integration.⁸ As Creswell et al note, “The underlying logic of mixing is that neither quantitative nor qualitative methods are sufficient in themselves to capture the trends and details of the situation. When used in combination, both quantitative and qualitative data yield a more complete analysis, and they complement each other.”²⁹

The process of integrating quantitative and qualitative data may occur in several ways, including merging the data, connecting the data, and embedding the data.³⁰ These processes are depicted in the [Figure](#). In implementation research and pragmatic trials, merging the data occurs in the analytic phase, when the 2 types of data are brought

together to answer the same question or related questions.²⁷ Connecting the data occurs when the analysis of one set of data (eg, quantitative results) leads to the need for, and thus subsequent collection of, another set of data (eg, qualitative data).²⁷ Embedding the data occurs when qualitative studies of implementation process or context are embedded within larger quantitative studies of outcomes in order to obtain depth or expansion.²⁷

DIMENSIONS OF METHODOLOGICAL COMBINATION

In implementation research, mixed methods have been used in different combinations to achieve a variety of purposes.²⁶ In both the study design and analysis, researchers must understand the rationale for the sequencing and priority of the methods used.¹⁰ Three dimensions are particularly relevant to the combination of methods. The first dimension is concerned with the order of the methods. Methods may be used either simultaneously or sequentially. When used in sequence, one approach (eg, qualitative) is used to answer questions that emerged following data collection using another methodological approach (eg, quantitative). This is known as expansion or explanation.²⁷ When qualitative methods are used to generate initial data that will enable the effective use of other methods, this is known as development.²⁷ In implementation research, such generative work may contribute to instrument development, conceptual development, and intervention development. One method may also be used to identify a sample of participants that will be used by the other method, a function known as sampling.²⁷

The second dimension pertains to the priority of the methods. One method is often operationalized as the dominant or primary method, while the other is subordinate or secondary.²⁷ Most studies of dissemination and implementation published to date have treated quantitative methods as the primary method because assessing the process of implementation is viewed as secondary to evaluating the effectiveness of intervention outcomes.²⁶ However, the 2 types of methods are often given equal weight in evaluating fidelity and assessing implementation barriers and facilitators.^{31–33}

The third dimension is concerned with the purpose of the methodological combination. The different methods may be used to answer the same question or related questions. When methods are engaged to answer the same question, it is known as convergence.²⁷ Convergence may occur in 1 of 2 forms: triangulation, which involves the use of one type of data to confirm conclusions reached from the analysis of a second type of data, and transformation, which involves the sequential quantification of qualitative data or the use of qualitative techniques in order to transform quantitative data.²⁷ In contrast, complementarity is when qualitative and quantitative methods are used to answer related questions in the process of evaluation or elaboration.²⁷

MIXED METHODS DESIGNS

Creswell has identified several mixed methods design typologies, 5 of which are particularly relevant to

Table. Mixed Methods Design Typologies

Mixed Methods Design Typologies	Timing	Priority
Convergent parallel design	Simultaneous collection of quantitative and qualitative data. Data merged for analysis.	Equal
Explanatory sequential design	Quantitative data collection, followed by qualitative data collection. Qualitative data used to explain quantitative data.	Quantitative
Exploratory sequential design	Qualitative data collection, followed by quantitative data collection. Quantitative data used to explain qualitative data.	Qualitative
Embedded design	One form of data is embedded within the other. Data collection may be sequential or concurrent.	Quantitative or qualitative
Multiphase design	A series of separate studies or phases using a combination of sequential and/or concurrent methods of qualitative and/or quantitative data collection.	Equal

implementation science.³⁴ These typologies are summarized in the Table. Convergent parallel design involves the simultaneous collection of both quantitative and qualitative data, then merging the 2 types together. A recent study by Povee et al, exploring factors that predict functioning in families with a child with Down syndrome, is an example of this type of design.³⁵ In addition to gathering quantitative data on the effect of maladaptive and autism-spectrum behaviors on the functioning of the family, the study collected qualitative data about the impact of a Down syndrome child on family activities, family holidays, and general family functioning. Data were then triangulated for a fuller understanding of the positive and negative effects of a child with Down syndrome on the family.

A second design type, the explanatory sequential design, involves 2 sequential phases: quantitative data are collected first, followed by the collection of qualitative data that can help to explain the quantitative data. Quarumby et al used this methodological combination to explore psychosocial and environmental factors contributing to children's participation in physical and sedentary activities.³⁶ In the first phase of the study, students aged 11 to 14 years responded to a questionnaire about their engagement in a variety of activities and the amount of time they devoted to each. In the second phase, semistructured follow-up interviews were conducted to explore the patterns that emerged from the quantitative data. The qualitative component of the study allowed in-depth exploration of barriers to children's physical activity and the reasons behind activity-related behaviors, providing insight into how children's family structures restrict the availability of joint family activities and impact the amount of time children spend on particular physical activities.

A third design type, the exploratory sequential design, also involves 2 sequential phases, but in the opposite order: qualitative data are collected first, followed by the collection of quantitative data that can help to explain and provide breadth for the relationships that emerged from the qualitative data. For example, in a recent study seeking to describe variation among states in the provision of new vaccines to underinsured children and to identify barriers to state purchase and distribution of new vaccines, Lee and colleagues first conducted individual in-depth

interviews with a small number of program managers representing different state vaccine financing policies, then incorporated the findings from those interviews to develop a national telephone- and paper-based survey of state immunization program managers.³⁷ This methodological approach allowed the researchers to determine the national percentages of underinsured children ineligible to receive publicly purchased meningococcal conjugate or pneumococcal conjugate vaccines in the private and public sectors, and to identify significant barriers to implementation among underinsured children.

In a fourth design type, the embedded design, data collection may be either concurrent or sequential, but one form of data is embedded within another form, and thus one form is more supportive of the other. Tan and colleagues used this approach to investigate the phenomenon of nonsuicidal self-injury among adolescents in Singapore.³⁸ The quantitative and primary stage of the study involved the administration of several survey instruments to a sample of adolescents who had engaged in nonsuicidal self-injury and a control group of adolescent who had not self-injured. Data were analyzed to understand the functions of nonsuicidal self-injury and its associations with a number of variables, including parental invalidation and academic stress. In addition, as part of the concurrent embedded strategy, in-depth interviews were conducted with a small sample of the adolescents in the nonsuicidal self-injury group. This supportive, qualitative component of the study enabled interviewees to discuss and clarify their experiences with self-injury, their family, and academic stress, and helped the researchers to ascertain the validity of the quantitative data by understanding the nuances of interviewees' subjective accounts.

Finally, a fifth design type, the multiphase design, consists of a series of phases or separate studies, each of which may use a combination of sequential and/or concurrent phases. Recent years have seen an increase in particularly innovative implementation research using multiphase designs. These include designs that have incorporated unusual combinations of methods, such as quantitative longitudinal data with qualitative longitudinal data, discourse analysis with survey data, and secondary analysis of datasets with qualitative follow-ups.³⁹ A recent investigation by Aarons et al of staff turnover in

a child welfare service system exemplifies the innovative combination of methods that are often used in this type of design.⁴⁰ In order to understand how evidence-based practice implementation impacts the child welfare provider workforce, they designed a staged, multimethod study involving longitudinal concurrent and sequential data collection over 5 years. The study design incorporated quantitative analysis hypothesis testing and concurrent utilization of qualitative data to validate the conclusions reached from the quantitative analyses. Quantitative survey data were collected in 4 waves over more than 2 years from home-based service providers. Survival analysis and discrete-time exponential proportional hazards modeling were used to examine turnover across waves. In addition, 3 waves of semistructured interviews and focus groups were conducted over a 3-year period with case managers, consultants (ie, trainers and coaches), and administrators within the system. Analyses of the quantitative and qualitative data were conducted separately and then integrated to illuminate issues related to staff turnover.

FUNDING MIXED METHODS RESEARCH

In an increasingly competitive funding environment, the ability to demonstrate an understanding of the benefits of mixed methods will serve applicants well. Although in past decades some medical and health researchers may have shied away from including mixed methods, particularly qualitative methods, in their proposals because of a lack of understanding about how and why to utilize them and/or concerns that such methods would not be valued by proposal reviewers, times have changed. Today most reviewers in study sections evaluating dissemination and implementation research expect to see proposals involving mixed methods. Indeed, increased emphases on patient-centeredness and community engagement within many funding agencies have created a demand for the utilization of qualitative methods in addition to quantitative methods. The increasing demand for mixed methods research can be seen in, for example, the recently created Patient-Centered Outcomes Research Institute (PCORI), whose interest in eliciting and understanding patients' perspectives and experiences is a particularly good match for approaches that involve qualitative as well as quantitative data collection. There has also been a recent proliferation of training and funding opportunities in mixed methods research by the National Institutes of Health's Office of Behavioral and Social Sciences Research (OBSSR) and the Agency for Healthcare Research and Quality (AHRQ), among other agencies. AHRQ has published a report on how to integrate quantitative and qualitative data collection and analysis in the study of patient-centered medical home models, in which it describes the uses, advantages, and limitations of mixed methods research designs.⁴¹

In addition to their recognition of the importance of patient-centered (and patient-reported) outcomes, such agencies' increased attention to mixed methods research

is largely due to their recognition of the importance of understanding how and why interventions function in real-world settings, as opposed to how they function in highly controlled settings with standardized protocols and atypical populations. For example, one of the most common methods of assessing interventions today is the RE-AIM framework, which was designed specifically to include measures that could address how well an intervention functions in the real world.⁴² Frequently used as the evaluation framework for pragmatic trials, RE-AIM has been included in numerous successful proposals. The model emphasizes 5 factors: reach, the proportion of the target population that participated in an intervention; effectiveness, an intervention's success rate upon implementation, defined as positive outcomes minus negative outcomes; adoption, the proportion and representativeness of settings that will adopt an intervention; implementation, the extent to which an intervention is implemented as intended in the real world; and maintenance, the extent to which a program is sustained over time and changes made to the intervention over time.⁴² Adequate examination of these 5 factors of the RE-AIM framework invariably requires the use of qualitative methods, often key informant interviews or focus groups with providers and/or patients. Applicants therefore need to demonstrate a commitment to a thorough measurement of each factor by proposing to employ qualitative as well as quantitative methods.

The expectation for mixed methods research has become so strong, and applicants' ability to demonstrate competence in such research has been so variable, that in 2011 the National Institutes of Health released recommendations for best practices for mixed methods research in the health sciences. These are intended to guide prospective applicants to National Institutes of Health (NIH) mechanisms as well as reviewers of applications and other stakeholders interested in mixed methods work.⁴³ Recommendations to applicants include: ensuring consistency among all parts of the application, including between the broader philosophical perspective and the selected methods; providing a clear rationale for the use of mixed methods; making clear the innovative nature of the mixed methods work being proposed; integrating an awareness of formal mixed methods research considerations within the application; taking time to assemble a successful mixed methods team, rather than simply adding people in order to fill methodological gaps; and including members on the team that hold qualitative expertise in addition to quantitative and mixed methods expertise. Similarly, guidelines for reviewers of applications include the recommendations to look for evidence of applicants' knowledge of mixed methods and to specifically "look for applications that fail to use mixed methods when they should have to best address the identified research problems."⁴³ The information provided in this article about qualitative and quantitative approaches and their effective integration will be helpful in achieving these NIH recommendations—and ultimately in the completion of successful mixed methods research projects.

CHALLENGES TO CONDUCTING AND DISSEMINATING MIXED METHODS RESEARCH

Given the promise of mixed methods approaches, as well as the increasingly recognized importance of understanding context, why are mixed methods not more commonly implemented in pragmatic trials and dissemination and implementation research? Perhaps one of the most significant barriers lies in the fact that most researchers have been trained primarily in either quantitative or qualitative methods, rather than both. In health services research in particular, a field in which many researchers have been trained with the medical model, there has been a relative paucity of training in or even exposure to qualitative methods. This compartmentalization of methodological expertise is often further compounded by relatively few opportunities for collaboration with social scientists or others who may be more familiar with qualitative approaches.

Another barrier concerns the difficulty of gathering and/or accessing process data. Many studies on delivery systems, for instance, tend to focus on structural properties rather than on management and team processes, at least partly because of the limited measures of indicators in existing databases for process data.⁴⁴ Gathering robust and useful process data is typically best suited to qualitative methods, which may require significant time, effort, and financial resources.

There are also a number of barriers to publishing or otherwise disseminating the results of mixed methods studies. At the writing stage, authors hoping to publish the results of mixed methods research are often stymied by the word limits required by most journals. Such word limits effectively constrain the possibilities of discussing in depth both the quantitative and qualitative aspects of the study, as well as the overarching lessons and holistic picture that can be drawn from analysis of both together. At the review stage, journals do not always effectively select appropriate reviewers for mixed methods studies. Reviewers of such articles should ideally be those who can interpret and appreciate both qualitative and quantitative methods, who understand the strengths and weaknesses of both approaches, and who can appreciate how the use of multiple methods deepens insight into the substantive topic of interest. Another problem at the editorial level is the lack of consensus about reporting standards in mixed methods reviews, which makes quality difficult to assess with currently available tools.⁴⁵

Further, even if a mixed methods article makes it through the significant constraints noted above, there are still limitations in how effectively the results will be disseminated. Although there have been dramatic advances in the scope and sophistication of mixed methods, there has not been parallel progress in methods of dissemination.²⁸ Instead, "results of multimethod studies are often segregated in different publications that reach limited and often nonclinical audiences."²⁸ In response, Stange et al have suggested 5 ways to better integrate the publication of mixed methods research.²⁸ First, authors may continue to

publish their quantitative and qualitative results in separate journals, as is typically done now, but with improved connection between the articles. Each article should prominently cite the other, thus linking the 2 clearly, so that the disparate audiences served by each journal can easily search out more information about the variety of methods used in the larger study. Second, authors may publish concurrent or sequential quantitative and qualitative papers in the same journal. Although these articles should still reference each other, and each discussion should contextualize one article's findings in relation to the other's, publishing in the same journal would make it easier for the reader to see how the articles fit together. Third, authors may publish an integrated single article describing all methods used and all the findings of the study. Although this option is the easiest, most straightforward way for readers to access and understand a mixed methods approach, and the breadth and depth of the findings it allows, such an article is likely to be quite lengthy, which is problematic given the word limits required by most journals. One way around this dilemma is to describe the main methods and findings in a succinct article, and then provide additional detail in one or more appendices. Fourth, authors might copublish not only separate articles detailing the quantitative and qualitative components of the study, but also a third article that draws overarching lessons from analyses across the multiple methods used. These articles could appear in separate journals or in the same issue of a single journal. A fifth and final option offered by Stange et al to better integrate the publication of mixed methods research lies in the development of an online discussion of readers and invited commentators to foster cross-disciplinary communities of knowledge following the publication of relevant methodological and substantive articles.²⁸

IMPLICATIONS AND FUTURE DIRECTIONS

The importance of pragmatic trials and dissemination and implementation research in guiding efforts to improve health care delivery and the health of populations is increasingly being recognized in the United States. Such research can produce data and insights that have direct and immediate relevance to both clinical care and policy. However, because this research focuses on real-world applications of interventions that have generally been shown to be efficacious under artificial, often ideal, conditions, an understanding of the critical role of context in implementation is critical. Because a given intervention may succeed in one situation and fail in another, quantitative data about effectiveness in a real-world setting should not stand alone without an understanding of how the context of both the setting and processes involved affected the results. Similarly, qualitative data alone are likely to provide limited insight into the effectiveness of an intervention without the breadth provided by quantitative data. It is in the combination of the strengths found in different types of data that the fullest understanding can be achieved. Although a variety of barriers currently exist

to conducting and publishing mixed methods research, pragmatic trials and dissemination and implementation research will benefit substantially from the knowledge generated through mixed methods research. Indeed, the likely benefit to research is so great that mixed methods should become virtually mandatory in these areas of research. Editors will soon expect to see mixed methods approaches in manuscripts; policy makers will soon look for mixed methods research in order to understand how a phenomenon is likely to operate in the real world; and clinicians will soon look for research using mixed methods approaches in order to assess whether they can effectively translate the results of research to their own practices.

The expanding role of mixed methods research also has important implications for future research training and for the organization of research teams. Researchers who focus on implementation science need training in both quantitative and qualitative techniques. Although individual researchers are understandably likely to continue to have greater expertise in one methodology over the other, all researchers will need to understand the strengths and limitations of both quantitative and qualitative methods and to recognize when and how they should be combined. The increasing importance of mixed methods research should also encourage the formation of more collaborative research teams involving medical, clinical, and social scientists from a variety of disciplines. Ideally, the providers, communities, and patients who are so often the subject of study will also have a strong voice in the dissemination and implementation of research that will be better designed, conducted, and interpreted through the use of mixed methods approaches.

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