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Connecting and Collaborating: Developing National Dental PBRN Study Concepts Through POD Engagement

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Abstract

Purpose—This article illustrates the process by which the Southwest Region of the National Dental Practice-Based Research Network (www.NationalDentalPBRN.org) fosters collaboration among practitioners and researchers in study concept development through Protocol Development (POD) Groups. The Southwest Region begins this process by engaging POD Groups, which comprise dentists, hygienists, and/or academic faculty who share research interests related to improving dental care.

Method—The POD's use the Tuckman four-stage model of group development (forming, storming, norming, and performing) to develop study concepts. This well-structured model encourages engagement among group members and enables quality discussion through organized sessions. This model provides milestones for the group's progression and for the members' interactions. The Southwest Region Directors play a crucial role in guiding and directing the development of PODs by aligning the members' research interests with the goals of the National Network.

Results—POD engagement using Tuckman's stages has been successful in developing study concepts for submission to the National Network. Between 2012 and 2014, the Southwest Region has developed 14 PODs from 275 research ideas. Five of these study concepts have been submitted to the National Network for approval, including the Novel Tobacco Products POD, which showcases the applicability of Tuckman's model.

Conclusion—Overall, the POD concept is a collaborative effort that brings together practitioners and academicians through shared research interests and capitalizes on participants' expertise and experiences. The Southwest Region will continue to develop PODs to foster new ideas for future studies in the Network.

Keywords

health research; oral health; partnerships/coalitions; practice-based; research design; practitioner; collaboration; engagement; protocol development

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INTRODUCTION

There is a translation gap in the U.S. health care system between research, everyday clinical care, and improved oral health outcomes. Research findings take an average of 17 years to filter down to practice (Westfall, VanVorst, Main, & Herbert, 2006). Dental practice-based research (PBR) is a form of research conducted in clinical practices by practitioners and their staff and is designed to answer questions that dentists face in routine patient care (Giannobile, Burt, & Genco, 2009). PBR conceived of and conducted in practice can follow a short feedback loop back into practice and thus shorten the usually laborious translation process of research findings into clinical practice. Recognizing the importance of PBR and its ability to improve the oral health of all Americans, the National Institute of Dental and Craniofacial Research (NIDCR) funded a national effort, The National Dental Practice-Based Research Network (PBRN) in April 2012 (Gilbert et al., 2013). The National Dental PBRN is composed of six regions within the continental 48 states. Each region consists of a regional office and dental practitioners who are committed to maximizing the practicality of conducting research in everyday clinical practice across geographically dispersed regions and diverse practice types. Its structure is designed to focus some activities at the regional level (e.g., close interactions with practitioners), while other activities of the entire network are better managed centrally (e.g., study development and dissemination). The central administrative base is at the University of Alabama at Birmingham. The University of Texas Health Science Center at San Antonio School of Dentistry leads the Southwest Region, which includes Texas, Oklahoma, New Mexico, Arizona, and Kansas. Currently this Region has some 1,100 of the 6,000-plus members nationwide. The continuing membership growth is a testament to the spirit of collaborative research that empowers the dental practitioners to identify relevant research questions to their practice and participate in the quest for solutions.

The National Dental PBRN recognizes the ability to sustain an existing PBRN is dependent on the number of studies conducted, quality of research, and meaningful engagement and retention of practitioners (Giannobile et al., 2009). Practitioner engagement and retention has been achieved by encouraging practitioners to be involved in study idea generation, study concept development, clinical study participation, online community forums, and continuing education meetings and seminars. Many practitioners demonstrate initial enthusiasm to be involved in research efforts—particularly study development—but they often lack the knowledge about research methodologies to be effective participants (Kieser & Leiner, 2012). However, the National Dental PBRN believes a key component of a successful PBRN is to encourage, support, and include members at all steps of the study development process, respective to their interests and availability. These steps include generating study ideas, developing protocols, implementing feasibility assessments,

collecting network-wide data, analyzing and interpreting data, making presentations, and publishing study results (Gilbert et al., 2013).

A multifaceted approach for eliciting study ideas is popular in medical PBRNs, where both practitioners and academic researchers are active in identifying study questions (Wotman, Lalumandier, Nelson, & Stange, 2001). The process has been described as “bottom-up” when study ideas are elicited directly from the network members and have been reported in the literature by both dental and medical PBR networks (Graham et al., 2007; Wotman et al., 2001). In a national survey of 86 primary care–based research networks conducting practice-based studies, only 1 in 7 (14%) of the responding PBRNs relied on their members to generate study ideas in a bottom-up approach. For one quarter (25%), research ideas came mainly from academic investigators in a top-down approach. Most (61%) relied on both their members and academic investigators for generating research ideas (Tierney et al., 2007). Typically, the National Dental PBRN draws on the experience and insight of both practicing clinicians and academic researchers to identify and frame research questions whose answers can improve the practice of dentistry. By linking these questions with rigorous research methods, the network has produced numerous study findings that are immediately relevant to the clinician and, in theory, more easily assimilated into everyday practice (Gordan et al., 2014; Lawson et al., 2015; The National Dental PBRN, 2012).

The idea generation process varies from region to region within the National Dental PBRN. In the Southwest Region, research ideas were mainly derived from participatory consensus workshops that were held at the annual and regional meetings where practitioners had the opportunity to express their research interests and share their research experience with colleagues (Mungia et al., 2015). Other ideas were identified from interactions with academic faculty at meetings and from individual Southwest region members who have a keen interest in a particular research topic. The Southwest region conducted five consensus workshops with groups ranging in size from 11 to 53 (197 participants total) and generated 275 research ideas between the years 2012 and 2014 (Mungia et al., 2015). There was a variety of ideas, and even though each group was distinctive, in both the participants and the setting, similar ideas emerged in different workshops. Ideas across the five sessions were collated into novel and similar categories of interest.

Workshop participants who were interested in the development of a research idea were identified during workshops and partnered with other practitioners and academic experts with shared research interests. From this, focused study groups were developed to maintain collaboration during the concept development process. The Southwest region refers to these groups as Protocol Development (POD) Groups. Tuckman’s (1965) four-stage group development model was adapted in order to allow the Southwest Region team to build a collaborative group capable of supporting a study through the entire development and implementation process.

Tuckman’s stage of group development model is widely accepted and has been defined as forming, storming, norming, and performing. This model was first proposed by Bruce Tuckman in 1965, who maintained that these phases are all necessary and inevitable for the team to grow, face challenges, tackle problems, find solutions, plan work, and deliver results.

In the first stages of group building, the forming of the group occurs. The forming stage of any group is important because the members of the team get to know one another, exchange some personal information, and share personal interests and expectations. The forming phase is often marked by a lack of clear direction and trust, and therefore supervisors of the group tend to be directive during this phase. During the storming phase, conflicts and disagreements are likely to arise due to a loss of excitement among group members or fragmentation due to group differences. Supervisors of the group during this phase may be more accessible but tend to remain directive in their guidance of decision making and professional behavior. In the norming phase, the group manages to have one goal and come to a mutual plan for the group. Some may have to give up their own ideas and agree with others in order to make the group function. In this stage, all group members take the responsibility and have the ambition to work for the success of the group's goals. In the performing stage of group development, the groups are able to work efficiently without conflict or need for external supervision. Supervisors of the team during this phase are almost always participative; however, the team will make most of the necessary decisions.

In this article, we used the Tuckman (1965) model as a framework for observing the stages of POD group development and as a lens to view the start of a practitioner and academic researcher partnership. To our knowledge, the Tuckman model has not been applied to the PBRN setting. The overall purpose of this article is to illustrate the study concept development process adopted by the Southwest Region of the National Dental PBRN through the POD group engagement for a research study on novel tobacco products.

METHOD

The initial stages of study concept development are critical to ensure the study can be successfully implemented and translated into busy practices. Key initial challenges in this process include selecting studies that are feasible and meet the goals and objectives of the network and its members, coordinating meetings between busy practitioners and academicians, and mediating disagreements. In multiple consensus workshops, novel tobacco products (i.e., e-cigarettes, hookah, and little cigars) were identified as an area in which a research and knowledge gap exists for dental practitioners. Practitioners cited a lack of information about the effects of novel tobacco products and how they should counsel patients. The Southwest Region directors decided this topic met the following criteria and was acceptable for further development:

1. Is this a researchable study question?
2. Is the National Dental PBRN the best place to answer the question?
3. Does this study fit with the goals and objectives of the Network?
4. Is this study feasible? Do we have the available resources?

The Novel Tobacco Product POD's formation and progress are outlined below using Tuckman's definitions for each stage of the model as adapted by the Southwest Region. Information on the POD for this article was gathered from meeting agendas and minutes.

Stage 1: Forming: Identifying a Topic and Building a POD

The Southwest Region Director and Deputy Director worked to form a POD and coordinate initial meetings in an effort to welcome practitioners and academicians to the process and answer any questions they had. Directors initially served as supervisors to the group. The Novel Tobacco Products POD consisted of one academic faculty and three dentists (one private practitioner and two faculties) from different cities within the Southwest Region and Southwest Region staff. The academician was a member of an academic research institution in one of the Southwest Region's states and was identified by her or his interest in this topic. The dentist members of the POD were identified during consensus-building workshops.

An initial conference call was held with all members of the POD in attendance. During this meeting, the Southwest Region Director outlined the steps necessary to develop and conduct a study through the National Dental PBRN. All members of the POD were given the opportunity to introduce themselves and explain their interest in this particular project. POD members came to an agreement about the goal of their group—to develop study concepts and protocols related to novel tobacco product use on a national scale. Several different study concepts were proposed, but no final decisions as to the specific direction of the study were made. Ideas included the following: creating continuing education materials, developing a motivational interviewing guide, and surveying existing knowledge and perceptions.

Stage 2: Storming: Identifying Roles and Dealing With Uncertainty

Early in the storming phase, the academician was chosen by the group to serve as the supervisor/principal investigator (PI) for the POD due to her expertise in academic research and grant writing. At this point, the POD members had proposed several different directions for their first study concept but felt some uncertainty in narrowing down their ideas into an achievable study concept. During several meetings, POD members refocused their ideas into a two-part study that the group felt was feasible within the National Dental PBRN. The POD decided the study would start with a survey of dental practitioners to identify knowledge gaps related to novel tobacco products.

The second part of the study would be informed by the initial survey and would include the creation and dissemination of a web-based training program to inform dental practitioners about proper counseling for their patients with regard to their use of specific novel tobacco products.

During the storming phase, an effort was made to ensure all POD members were present at meetings so that opinions were elicited from all members and that consensus was achieved when determining the format of the study. Attention to these details was imperative in order to foster quality and productive conversations among the diverse group and to minimize the change of fragmentation within the group.

Stage 3: Norming: Decision Making and Gaining Consensus

Through twice-monthly conference calls, the novel tobacco products POD began to make decisions about study-specific goal details. These included specific aims, hypotheses,

outcome measures, study eligibility, and study time line. When multiple ideas were proposed for a certain aspect of the study, the Southwest Region Director reminded POD members of their agreed-on purpose as well as the resources available to the National Dental PBRN.

For example, PODs members discussed whether they should create web-based or printed self-study continuing education materials. Through consensus, it was agreed a web-based program would be ideal because it would allow for the program to be updated in real time as new information became available about the oral and systemic health effects of novel tobacco products. In addition, this better fit with the needs and preferences of National Dental PBRN members—information obtained from enrollment questionnaires showed that a majority of practices had Internet access in their practice and preferred to receive information online. These types of conversations continued until PODs members had discussed all of the criteria that would be necessary to complete and submit a study concept to the National Dental PBRN.

Stage 4: Performing: Preparing a Study Concept Template and Submitting the Study Concept to the National Dental PBRN

Once the POD discussed the different aspects of the study that would be detailed in the concept template, members were assigned a specific section. Once this information was gathered via e-mails, the PI worked to transfer the group's ideas and sections onto the study concept template, which provides a two- to seven-page overview of the study. When a draft of the novel tobacco products study concept was ready, the PI shared it with the other members of the POD. The PI clarified details about which she was uncertain, and POD members had the opportunity to respond to the formal presentation of their study concept. After several iterations of the study concept were reviewed by POD members, the Southwest Region Director submitted it to the National Director of the National Dental PBRN for further review. The Executive Committee (EC) conducted an external review of the study concept after all POD members approved it with majority voting. The EC is the key decision-making body of the network and is structured to make the network practitioner-driven. By design, majority voting authority resides with its six practitioner-investigator representatives. One vote is also given to the National Network Director and the Director of the Coordinating Centre, and an NIDCR representative serves on the committee as an ex officio, nonvoting member (Gilbert et al., 2013).

RESULTS

Table 1 offers examples of activities related to the Novel Tobacco POD, separated by the month that corresponded to each of Tuckman's developmental stages. Forming activities included the following: (1) assessing the feasibility of the general topic, (2) identifying group members, (3) scheduling an initial welcome meeting, and (4) outlining the goals for a study concept development. The storming events consisted of (1) opening discussion on the research topic, (2) narrowing the focus of the study concept from multiple research ideas, and (3) defining and assigning roles to team members. When norming occurred, group members felt comfortable expressing ideas and sharing experiences toward a goal of building a collaborative document. The POD used negotiation and consensus to make study-

specific decisions necessary to move the development process forward. Finally, the performing activities focused on finalizing the study concept and submitting it to the National Network Director for review. The tasks related to this performing stage included outlining, assigning sections, and writing/editing the document.

Following the initial review of the novel tobacco study concept by the National Network Director, the concept was submitted to the National Dental PBRN EC. The EC judged that the topic was relevant to dental practitioners in the National Dental PBRN and that it could feasibly be studied within the network. The concept was finally submitted for the NIDCR Clinical Studies Group to evaluate it, relative to their programmatic interests for the network. The NIDCR Clinical Studies Group broadened the concept to the more general issue of how dental practitioners acquire information for areas of clinical uncertainty (i.e., novel tobacco products). This broader concept currently is in the POD phase. The NIDCR Clinical Studies Group is composed of NIDCR programme officials, the NIDCR Office of Clinical Trials Operations and Management, and others from the Institute. The Clinical Studies Group can approve with or without recommendations, or disapprove the concept. If disapproved by the Clinical Studies Group, no further study development occurs. If the concept is approved by the Clinical Studies Group, then a Complete Protocol is developed (Gilbert et al., 2013). The Southwest Region currently has 14 PODs engaged in some level of study concept development. Fourteen PODs have been developed from 275 ideas that were generated during the workshops (2012–2014), with topics ranging from xerostomia management to laser assisted–periodontal therapy. Five study concepts developed through PODs have been submitted to the National Network EC for review. The full scope of research ideas generated and the PODs that were developed are listed in Table 2.

DISCUSSION

In scientific theory and methodology, academicians are the experts and the practitioners are the laypersons, but in the POD format, the roles are reversed. The novel tobacco products POD shows that this structure is an effective method to bridge academicians and dental practitioners together, resulting in strong research concepts and designs that have direct relevance to daily clinical practice.

Tuckman's (1965) stages of group development model guided the formation and functioning of the Southwest Region's POD groups. Academicians and practitioners both have expertise about issues relating to oral health, but barriers including busy schedules, differing skills sets, and experience with markedly different organizational cultures can inhibit successful collaboration (Macduff & Netting, 2000). As noted by Hess and Mullen (1995), practitioners and academicians are accustomed to working with considerable autonomy. Collaboration between the two groups requires that members relinquish some of this autonomy and rely on the expertise of others and be flexible as the group evolves.

PODs provide an opportunity for these two groups to collaborate and integrate their particular expertise in a mediated environment while working on a common goal. By being aware of the dynamics that often occur during the forming, storming, norming, and performing phases, the Southwest Region of the National Dental PBRN was able to refine

the nature of PODs in order to maintain the group's cohesiveness and produce a final product in line with their initial goal.

One of the main criticisms of Tuckman's (1965) model is that it lacks applicability to real-life group situations due to the linear movement from Stage 1 through Stage 4 (Rickards & Moger, 2000). This does not account for the complex nature of groups and the fact they develop and evolve in myriad ways, not always in a definitive, sequential order (Henderson-Loney, 1996; Jessup, 1992; Shaw, 1971). McMorris, Gottlieb, and Sneden (2005) showed the Tuckman model can be applied at the practitioner level when understanding and embracing the fact that some groups may experience overlap between the four stages of group development. Many long-standing groups go through these cycles several times as they react to changing circumstances. For example, a change in leadership may cause the group to revert to storming as new people challenge the existing norms and dynamics of the group. Additionally, it is possible groups will be engaged in multiple stages of the model at any given time.

Within the PBRN setting, we found that allowing groups to move back and forth between forming, storming, and norming in performing was beneficial. We believe the ability to do this helped the POD feel ownership of their project and thus reduced tensions and maximized efficiency. Overall, the Southwest Region continues as an active resource for study idea generation, averaging one new idea per month over its first 2 years of activity. This approach and model have been very successful in bringing together practitioners and academicians through a shared research interest, capitalizing on respective expertise and experience.

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TABLE 1

Partnership Activities Within Tuckman's (1965) Stages of POD Group Development

Stages of Development	Date of Occurrence	Activity
Forming	June 2013	• Southwest Region Directors assessed feasibility of the general topic
		• Southwest Directors and Regional Coordinators identified POD group members
		• Southwest Regional Deputy Director scheduled initial welcome conference call
		• POD members introduced themselves
		• Directors outlined the steps to develop a study concept
Storming	July 2013, August 2013	• Open discussion on the research topic occurred
		• Narrowed focus on a particular research question
		• Assigned roles to team members
Norming	September 2013	• Outlined time line for concept development
		• Discussed specific aims, hypotheses, outcome measures, and study eligibility
		• Discussed criteria for submission of concept to EC
Performing	October 2013, November 2013	• Assigned sections of the study concept template to group members
		• PI created a draft using the ideas and sections of other members
		• Concept reviewed and edited several time by all team members
		• Completed concept forwarded to the National Network Director for initial review

NOTE: POD = protocol development; EC = executive committee; PI = principal investigator.

TABLE 2

Development of Protocol Development Groups From Research Ideas Generated

ToPs Ideas Generated		PODs	
1	Effects of e-cigarettes	1	Novel tobacco products
2	Dry mouth study (effective treatment options)	2	Xerostomia and dental caries
3	Drug induced xerostomia and caries risk	3	Sealant recommendation
4	Correlation of dry mouth and caries	4	Fluoride implications
5	Effectiveness of pit and fissure sealants on smooth surfaces	5	Immediate implant placement
6	Retention of sealants	6	Oral health literacy
7	Definitive study on the effectiveness of fluorides	7	Craniofacial anomaly
8	Knowledge of current fluoride usage	8	Laser-assisted periodontal therapy
9	Immediate placement and loading of implants	9	Dental office diagnostic testing
10	Primary household language: "How does it affect restorative needs?"	10	Prophylactic use of antibiotics in dental practice
11	Mini implants in adolescent population congenitally missing teeth	11	Sleep apnea
12	Treating periodontal disease with lasers	12	Critically appraised topics
13	Oral and systemic health	13	Dietary effects on oral health
14	Diabetes vs. periodontal disease	14	Bisphosphonate osteonecrosis of the jaw
15	What percentage of dentists following the ADA antibiotic guideline		
16	Relationships of antibiotics to various dental diseases such as diabetes, etc.		
17	Oral appliances for sleep apnea		
18	Recognizing and referring patients with possible sleep apnea		
19	Use of cariogenic beverages in Hispanic children		
20	Bisphosphonate treatment and referral		

NOTE: POD = protocol development; ToPs = technology of participation; ADA = American Dental Association.