New Directions in Interorganizational Collaboration in Dentistry: The CAMBRA Coalition Model


Abstract: Caries management by risk assessment (CAMBRA) represents a paradigm shift in the management of dental decay. It treats dental caries as an infectious disease that is curable and preventable. The science supporting CAMBRA has been present for quite some time; however, its clinical adoption, until recently, remained slow. This article analyzes the Western CAMBRA Coalition, a special collaboration of diverse groups of independent organizations based in the western region of the United States. This coalition, which has formed an interorganizational collaborative (IOC), has evolved over four years and has led to significant progress in the clinical adoption of CAMBRA. Theoretical perspectives of reasons and the conditions that drive organizations to collaborate will be applied to the CAMBRA model, concluding that IOCs offer great benefits in promoting CAMBRA as well as future innovations in dental treatments.

The purpose of this article is to report on a successful collaboration to advance the science of caries management and to apply organizational research to predict the likelihood that this model can be generalized for use in other areas. The working group, assembled from different aspects of the dental profession, was named the Western CAMBRA Coalition and included unofficial representatives of education, research, industry, organized dentistry, governmental assistance agencies, the state licensing board, third-party payers, and private practice clinicians.

What Is CAMBRA?

Caries management by risk assessment (CAMBRA) represents an evidence-based approach to preventing, reversing, and treating dental caries. The risk assessment and the emphasis on the whole disease process, not just the cavitated stage of lesion progression, make CAMBRA different from the traditional restorative approach in treating dental caries. The caries balance method first described by Featherstone is an evidence-based method to measure caries risk and determine effective treatment options. Figure 1 illustrates the analogy of a “balance” and is used to describe the dynamic interaction of what science has proved to contribute to dental caries (the pathogenic factors) compared to what research has shown to protect from dental caries (the protective factors). By evaluating the caries balance of a patient, an astute clinician can assess the likelihood that the patient will develop dental caries. The assessment of risk will also suggest the correct interceptive treatment strategies to prevent or reverse the caries process. A recently completed randomized clinical trial has demonstrated the effectiveness of this approach.

The Western CAMBRA Coalition began with an informal lunch held at the Clinical Preventive Dentistry Leadership Conference sponsored by Procter & Gamble in 2002. The group, comprised of representatives from all five dental schools in California, quickly understood the potential of a simple yet unique concept: by collaborating across previously sometimes competitive boundaries, dental professionals could improve caries management standards. Dental students must graduate and pass state licensing boards and work with current research, third-party payers, organized dentistry, and industry to provide the best treatment services for patients in private practice. Thus, the decision was made to expand the coalition to incorporate other important members, including a representative from the den-
The goal was to disseminate new ideas where previously there was no existing network for sharing this information, to obtain support from others, and to adopt these new changes in caries management. Educators have been struggling to teach what science discovered two decades ago, and the adoption of CAMBRA has remained slow. A conduit for information based on reciprocity was needed so that those within the network could share information freely, confidentially, and in the spirit of cooperation and coordination for the common good. Since 2002, the coalition has grown to include representatives of both general and pediatric dentistry from the five California dental schools, as well as dental school representatives from Oregon, Washington, Arizona, and Nevada.

Building the CAMBRA Coalition Model

CAMBRA has gained momentum rapidly since 2002. A consensus conference held in 2002 resulted in two entire issues of the Journal of the California...
Dental Association (February and March 2003) dedicated to CAMBRA. Both issues reviewed the scientific literature on CAMBRA. The March issue contained a consensus statement with sample caries risk assessment and intervention forms. Both issues can be accessed by the public and downloaded, without charge, at www.cdafoundation.org/journal.

In 2004 the CDA Foundation and Dental Health Foundation obtained a $7 million First 5 California Oral Health Education and Training Project Grant to educate dental and medical professionals in California about the value and methodology of using CAMBRA to combat early childhood caries. All nine dental schools in the CAMBRA Coalition are implementing CAMBRA into their training programs to various degrees. The WCMID has reported a growing interest in CAMBRA from practicing clinicians. Key opinion leaders were asked to speak on the topic at the WCMID annual meetings.

Why were members so willing to participate? The idealistic answer is that scientifically and ethically it is the correct thing to do. This article will explore other reasons to collaborate. A review of literature concerning the formation of interorganizational relationships suggests the momentum with respect to CAMBRA might be related in part to the relationships formed from the CAMBRA Coalition. As a result, we must next ask this question: how can the interorganizational model be used in other parts of the nation and world, as well as other aspects of dentistry?

The same year the CAMBRA Coalition was created, M.M. Cohen Jr. predicted that dental caries would be treated pharmacologically, but that education would face obstacles in teaching these concepts. It is interesting to read Cohen’s article, “Major Long-Term Factors Influencing Dental Education in the Twenty-First Century,” in light of CAMBRA. Cohen stated many of the points that were communicated by the CAMBRA Coalition:

1. The medical model of caries management (CAMBRA) will prove to be an important paradigm in the twenty-first century.
2. Dental education will be slow to integrate this new science.
3. Dental research often has little impact on dental education.
4. There is minimal communication between researchers and clinicians.
5. Integrating scientific and clinical approaches will be difficult.
6. Clinical faculty members do not find this paradigm “relevant to the practice of clinical dentistry.”

7. Students viewed it “as simply a hurdle to jump over” to get into the clinic, and that view was often “reinforced by clinical dental faculty.”

Dissemination of CAMBRA relies on the interactions of individuals and their network of relationships, or “social capital.” Subramaniam and Youndt found that social capital positively influences innovative capabilities, especially those that are considered radical in nature. Unless individual knowledge is networked and shared, it provides little benefit to organizations in terms of innovative capabilities. Because CAMBRA is a radical departure from the traditional dental restorative approach, this study helps to explain the success of the CAMBRA Coalition, where intellectual capital is freely shared. Clearly, without this sharing of social capital, Cohen’s observation that science alone is not enough to evoke change is certainly relevant. Over a decade ago Anderson et al. stated that science was suggesting a different way
to manage dental caries⁶; however, the adoption of CAMBRA until recently remained slow.

Research related to interorganizational collaboration (IOC) or interorganizational relationship (IOR) specifically in the dental literature was difficult to find. It appears that there is little or no research in this arena or that those studies have not been reported. However, rich literature exists concerning IOCs or IORs among nondental organizations. Much of this is applicable to the CAMBRA Coalition model. To explore this model, it is instructive to analyze the reasons and conditions that drove independent organizations to choose to network.

IOCs are created when enduring transactions, flows, and linkages are shared among or between an organization and one or more organizations in its environment.⁷ In a seminal work, Oliver identified six determinants that predict the formation of IOCs. Oliver identifies necessity, such as a need to meet legal or regulatory requirements, as a primary driver for creation of an IOC. Although there are no mandates for caries management per se, there are legal and standard-of-care issues related to undertreatment and overtreatment. Undertreatment occurs when restorative dentistry is performed without regard for the caries risk of the patient or when the underlying cause of dental caries is not treated. A typical example of undertreatment would be an extensively restored mouth that has succumbed to secondary caries because chemotherapeutic and preventive measures

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**Figure 3. The need for a solid collaborative relationship among the educator, researcher, and clinician**
were not considered; that is, the initial infection was not treated and the patient was not offered preventive options or solutions to deal with the causative disease factors. An example of overtreatment would be performing procedures that are not needed under the guise of minimally invasive dentistry or prevention. Questions of overtreatment often raise issues about the ethical treatment of the patient.

A collaboration based on asymmetry refers to the motive of one organization to exercise power or control over another organization or its resources. The organizations that formed the CAMBRA Coalition exercised asymmetry in a reverse fashion. While there is no evidence that any organization attempted to exercise power or control over any other member of the coalition, it is likely that members of the CAMBRA Coalition were motivated by avoidance of such control: not collaborating might mean losing out on information or losing a competitive advantage in a certain area. While a motive to take control over another organization (asymmetry) is a second prime driver for IOCs, forestalling such control by others may be an equally strong stimulus.

In contrast to asymmetry, a collaboration based on reciprocity, a third primary driver, emphasizes cooperation, collaboration, and coordination among organizations, rather than power and control. Participating parties in the CAMBRA Coalition were pursuing common and mutually beneficial goals and interests based on free and equal exchange of knowledge and information. To stimulate honest exchange among participants, two requests were made: leave egos at the door, and keep what is said in the meeting confidential. The scarcity of knowledge in this new emerging paradigm of caries management certainly favors cooperation, harmony, equity, and mutual support of its members. The unique diversity of organizations making up the CAMBRA Coalition allowed the participating dental schools to openly discuss and solve problems within institutions not only from an educational perspective, but also gave them the benefit of input from members of industry, organized dentistry, research, practicing clinicians, and the state licensing board. This approach proved to be invaluable in refocusing institutional problems toward a more global perspective on the dental profession. One problem with reciprocity is keeping member contributions equal. For example, any one member could make little to no contribution and still enjoy the benefits of the collaboration.

A fourth determinant of IOCs described by Oliver is efficiency, an organization’s desire to decrease cost, waste, downtime, cost per patient, etc. The CAMBRA Coalition meetings resulted in several institutions using similar protocols and products that proved to be most efficient. This in turn led to several universities working with industry to purchase supplies based on economies of scale. The coalition has also discussed the efficiency of resources when it comes to treating underserved populations.

CAMBRA is a fairly new concept and the scarcity of its current clinical implementation makes universal adoption questionable at this time. Dental schools need stability or predictability in this uncertain environment. Stability is the fifth reason for IOCs outlined by Oliver. The CAMBRA Coalition created stability, with all nine universities coming to consensus on the main concepts of caries management. This made it less likely that any one university would be viewed as radical. The more consistent the dental schools are with their message, the more influence they have on the dental profession as a whole (licensing boards, policy makers, third-party payers, and most importantly, graduates and practicing dentists).

Organizational collaboration based on legitimacy, the sixth and last determinant described by Oliver, seeks to increase the appearance of agreement with the prevailing norms, rules, beliefs, and expectations. In the case of the CAMBRA Coalition, scientific research over two decades, as well as a national and international paradigm shift, certainly gives it legitimacy. The CAMBRA Coalition attempts to leverage this strategy through its diverse approach, with the ultimate goal of improving patient care. As in the case of stability, the more legitimate CAMBRA appears, the more it will impact the changing standard in caries management. Similarly, schools that are not as far along as others in implementing CAMBRA can gain legitimacy by forming relationships with those schools known to be leaders in this field. Of course, because of the positive image of some of its members, one could also argue that the participants in the CAMBRA Coalition are doing so mainly to improve their own reputation, image, prestige, or give the appearance of keeping up with prevailing trends.

**The Ethical Perspective**

Dentistry is a profession driven by a code of ethics; ideally, a dentist does things simply because it is the correct thing to do. This article analyzes
intellectually why different organizations enter into collaborations. Often it is the heart, not the brain, that guides what individuals and, in turn, organizations do. It is our opinion that, in the case of the CAMBRA Coalition, the overwhelming reason participants chose to form relationships is for the common good. Table 1 summarizes the ethical principles involved and needs no further comment.

Summary

Applying interorganizational collaboration theory to the formation of the CAMBRA Coalition helps explain the elements that contribute to its success. The CAMBRA Coalition mixes a number of critical factors to support, rather than impede, its development. In the end, the ethical issues and desire to do what is best for patients cannot be discounted as powerful reasons for collaboration. Another determinant of this IOC, which was not included in the theoretical model, was propitious timing. Without the science of CAMBRA being in place, as well as an international and national trend for caries risk assessment, the coalition would not exist. The many organizations that form the CAMBRA Coalition make it unique in dentistry. This distinction translates into a significant advantage for advancing a new standard for the management of dental caries.

This model merits future study because it has applications to other innovative treatment strategies in dentistry. If education, research, government, business, and practicing dentists can form relationships and overcome their natural desire to remain independent, new treatments can be developed that will benefit patients throughout the world. The Western CAMBRA Coalition encourages dental schools across the nation to organize by region and to join the next WCMID meeting in San Diego, CA, August 16-19, 2007. For more information, contact the corresponding author of this article or go to www.wcmid.com.

Acknowledgments

This article is based on information presented at the CAMBRA Coalition meetings. Support for these meetings came from the California Dental Association Foundation, the World Congress of Minimally Invasive Dentistry, and the dental industry. We would also like to thank Bruce Peltier and Alan Budenz, as well as John Featherstone and the entire CAMBRA Coalition, for their contributions to this article.

REFERENCES