THE COMPLIANCE PARADOX: WHAT WE NEED TO KNOW ABOUT “REAL-WORLD” DIETARY SUPPLEMENT USE IN THE UNITED STATES

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Current research on dietary supplements (primarily survey-based prevalence studies and clinical trials of safety and efficacy) is inadequate for understanding how consumers use supplements in the real world. Analyzing interview data from formative research with dietary supplement users (N=60), we observed skepticism in the way our informants interpret scientific information about supplements, trust in referrals from those they feel are like them, and experimentation with products in order to tailor them to their bodies and needs. We stress the need for qualitative research focusing on patterns of supplement use in context (rather than as isolated supplements in fixed doses), the network effect of supplement use, and the way information about supplements is translated and transmitted. Furthermore, we urge clinicians to pay careful attention not only to whether patients are taking dietary supplements, but also how supplements are being used alone and in combination with other supplements, pharmaceuticals, and over-the-counter (OTC) medications. (Altern Ther Health Med. 2007;13(2):48-55.)

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Although dietary supplements may be recommended by healthcare practitioners, the majority of supplement use is self-prescribed. For example, Patty, age 30, takes 2 dietary supplements that she heard about from her sister-in-law: green tea extract and kava kava. She says that she follows the labeling directions for the green tea extract, taking “1 to 2” 500-mg green tea capsules daily. However, she acknowledges that her daily dosage of green tea (either 1 or 2 capsules) depends on whether she feels her diet for the day was “healthy”—which she defines by having meals “low in fat and calories and high in protein”—or whether she was able to exercise during the week. If she has been able to follow her diet and exercise regimen, she takes only 1 capsule per day. Patty also reports that if she felt she was not going to be able to fulfill her health goals, she would take 2 capsules per day to “balance things out.” On the other hand, Patty does not follow the label on the kava kava, which recommends “one 250-mg capsule, 2-3 times daily, preferably with meals.” Instead, Patty’s use is more intermittent. She takes 1 capsule in the evening, 2-3 times a week. Initially, she tried taking this supplement 3 times a day, but says it made her feel too sluggish. After a particularly stressful day dealing with work and her children, she feels 1 capsule in the evening is effective for her needs and her body.

Dietary supplement use is widespread. In 2005, sales of herbs grew 2.1% from the previous year to total an estimated $4,410 million. As of 2002, 40% of the US population reported taking at least 1 vitamin or mineral supplement in the past week, and 18.9% of adults had used at least 1 herbal supplement in the past 12 months. To date, however, there is no research on consumers’ adherence to and compliance with dietary supplement labeling instructions. Furthermore, we have little information on the way supplement users like Patty gather, interpret, and respond to information about dietary supplements, and how they use these products in their daily lives. However, unlike many other conventional and complementary and alternative medicine (CAM) therapies, the widespread use, ease of access, ease of consumption (in pill form), and bioactivity of dietary supplements make understanding real-world patterns of supplement use an important priority for healthcare providers and CAM researchers.

Current research on supplements (primarily survey-based prevalence studies and clinical trials of safety and efficacy) has been inadequate for addressing these issues. Large numbers of studies have focused on the prevalence of supplement use within disease populations, within demographic groups, and among the population as a whole. Attempts to quantify how supplements are being used on a day-to-day basis have been difficult, however. Murphy et al. comparing 24-hour supplement intake recalls with intake questionnaires, found that neither “could be considered a ‘gold standard.’” In fact, the authors suggest that “data from the recalls covered too short a period of time to represent usual supplement use, while the data from the questionnaire covered a longer period but did not reflect specific product use” nor intermittent or short-term use.
We suggest that there is an urgent need for qualitative and innovative research aimed at understanding how supplements are being used in the real world. Research along these lines should pay careful attention to how consumers get information about supplements, and how they make decisions about what supplements to take, how much to take, and when. In addition, we urge clinicians to pay more careful attention to not only whether patients are using dietary supplements, but to how patients are using them alone and in combination with other supplements and with conventional treatments.

This study was motivated by the apparent paradox underlying dietary supplement regulation in the United States. Although the 1994 Dietary Supplement Health and Education Act (DSHEA) allows for a limited number of approved health and disease claims on supplement labels, the vast majority of supplements (because their efficacy in treating disease has not been established) are labeled with more general claims about how the product is intended to affect bodily structure or function. Consumers, however, appear to have little difficulty reinterpreting the creative names and images and "structure and function" claims as thinly veiled health and disease claims. Thus, despite manufacturers abiding by the letter of the DSHEA, consumers can decode the specific ambiguity of the structure and function claims to locate a potential treatment for almost any health condition.

The Institute of Medicine of the National Academies (IOM) committee for the study of CAM in the United States has characterized the lack of data on supplement users' adherence and compliance to labeling (and others') instructions as "a major oversight in current CAM research." The IOM notes that "despite all the attention given to proper labeling, recent survey data and clinical trials indicate that dietary supplements are not being used according to label claims." Instead, many supplements are being taken for specific health concerns and health promotion, even though the effectiveness of the supplements has not been demonstrated.

As we have reported elsewhere, our interviews corroborate this observation. Our interview subjects reported using supplements for a wide range of reasons that went well beyond the "structure and function" or "general wellness" claims on supplement labels. Some of these include explicit illness management efforts (eg, to reserve pharmaceuticals for other occasions, to manage chronic illness, to keep disease in remission) and harm reduction strategies (eg, to counteract unhealthy behaviors, to mitigate the negative effects of illness or environment). In fact, given that off-label uses for supplements are in wide circulation in popular supplement literature and magazines, as well as in the media and by word of mouth, those who mentioned off-label use of supplements did not consider it risky or unusual. In fact, several of our interviewees suggested that their off-label uses conformed to mainstream supplement use—referring to it as "just the regular" and "nothing exotic."

Ultimately, the DSHEA regulation has created a paradox: the information provided on supplement labels—that is, "structure and function" claims—do not provide large numbers of supplement users with the basic information they need to make informed decisions about dosage, frequency, and duration of use. Given this paradox, is it possible for supplement users to be compliant? With whom or what ought they be compliant? Labels providing ambiguous instructions about how to use a product for ambiguous reasons? Authorities offering advice in books and magazines and on the Internet? Friends or family members? Together, these issues beg the question, how are supplement users deciding what to use and how to use it?

With no clear, authoritative source of information, supplement users must determine for themselves who or what sources of information to trust and how to develop a supplement regimen that works for them. In this paper, we look to open-ended interview data collected from dietary supplement users for insight into basic questions about how supplements are used and the rationale that guides patterns of use. Due to the formative "issue-generating" stage of our research, we do not suggest that the data we present is conclusive or representative. Rather, we argue that these data suggest areas that are in need of further ethnographic exploration.

**METHODS**

The data for this paper were generated from a pilot study that was approved by the University of Arizona institutional review board in which we interviewed 60 dietary supplement users between July 2003 and July 2005. Participants were purposively sampled in the southwestern United States; the only eligibility requirement was that they said they had used at least 1 dietary supplement other than a routine daily multivitamin in the past 30 days. Survey literature consistently finds that women use dietary supplements more frequently than do men. Accordingly, we oversampled women (38; 63%). We purposively selected male and female participants from several different age ranges (see Figure) and followed general guidelines about the size of nonprobabilistic samples to reach thematic saturation.

Both authors conducted single semi-structured, open-ended interviews with participants, asking about their experiences taking dietary supplements and herbal medicines (both terms were used) and what supplement(s) they used, why, how, and how often. We also asked where they found out about the supplement in question. We encouraged participants to tell us a narrative about their supplement use and to speak freely about any issues or ideas related to their own supplement use and/or their observations about supplements in the media, on the Internet, and elsewhere. This strategy was deliberately employed to generate a list of issues deemed important to supplement users. Interviews varied in duration from 15 to 60 minutes with most interviews lasting about a half hour. In all cases, informants needed little prompting or encouragement to launch into a discussion about supplements. All informants appeared to have something to say about this topic, with many using the discussion of supplements as a springboard to reflect on the fast-paced nature of their lives and the hazards of modern life. We took careful notes both during and after interviews and captured verbatim responses as often as possible. In an effort to remain as unobtrusive as possible and to encourage free...
expressed in an environment unfettered by technology, we did not audiocassette interviews.

In our qualitative data analysis for this paper, we examined interviewees' remarks relating to one of our primary research concerns: users' adherence to dietary supplement product labels. That is, we looked specifically at how people said they decided to use dietary supplements, how they determined dose, and the extent to which dosage was determined by product labels. Both authors scrutinized the data individually for themes that appeared to be particularly salient in individual narratives. All the data were then re-examined by the authors, looking specifically for the repetition of themes to determine whether a particular perspective was shared (ie, potentially indicative of a pattern) or idiosyncratic.23

We negotiated the validity of our findings through discussion to consensus.24 Sandelowski and Barroso, following Eisner25 and Morse,26 argue persuasively that the explicit process of negotiating validity to consensus may ensure more validity than demonstrating inter-rater reliability since "such techniques simply show that raters can, or can be made to, agree."24,25,26 Given that our interviews were open-ended and exploratory in nature, themes that emerged spontaneously from multiple participants were interpreted as findings worthy of further exploration. We have selected and present quotes to illustrate our findings.

INFORMATION SEEKING AND DECISION MAKING

To advance our understanding of the DSHEA paradox, we looked to our data to provide insight into the question, with whose recommendations (if any) are supplement users complying? Our interviewees report having consulted a wide range of sources for recommendations. Information about dietary supplements is available from distributors, in books, on the radio and from other media sources, through the Internet (on independent sites, academic sites, and those affiliated with manufacturers), from manufacturers on product labels, from friends and family, and from biomedical doctors and CAM practitioners. We have discussed a number of these sources in detail elsewhere.27 Noting the wide range of sources that informants consult does little to advance our understanding of supplement compliance, however. The most fruitful place to look for an understanding of supplement compliance is to supplement users' own explanations for how they determine what supplements to use and how to use them.

When we examined the data generated from our interviews for statements related to the "how" of dietary supplement use, 3 key compliance-related themes emerged. First, although supplement users receive information from a wide range of sources, 12 (20%) of our interviewees expressed a general skepticism about the value of the information received from most of these, including "scientific" information about clinical trials of efficacy. In contrast, 21 (35%) thought highly of information and recommendations coming from lay referral networks of family members and friends. Finally, 14 (23%) of the supplement users we talked with characterized their method for determining what supplements to take (and how to take them) as an "experiment" in which they overwhelmingly favored their embodied knowledge and personal experience with supplements over "expert" sources of information. Let us stress that not all dietary supplement users experiment with how they use their products; however, the need to personalize one's supplement regimen appears to be prevalent—and this tailoring is often accomplished through experimentation. We will explore each of these themes.

"Healthy" Skepticism

Many studies have shown that supplement users have substantial trust in the safety of dietary supplements.28 In a recent study of perceptions of CAM (primarily dietary supplements, based on the authors' definition of CAM) by emergency department patients, the authors found that nearly three-quarters (74.5%) of those who had used CAM in the past 12 months (vs 51.1% of those who had not) agreed or strongly agreed that CAM therapies are safe.29 Despite the trust supplement users appear to have in their products, this does not appear to carry over into trust of the advertising and media reports about benefits and risks of dietary supplements. Although we did not systematically ask study participants about their level of trust in information sources, many volunteered a great deal of widespread skepticism in the information available from manufacturers, in the media, and on the Internet. For example, Dave, age 32, told us, Now that natural drugs are getting popular, everyone is trying to sell them and make money. Look at the TV. Everyday, you see those ads for that product—what is it called—to enhance the size of your penis, and then there are natural breast enlargement creams, and how about all those natural dieting products. You got to ask yourself what the government is doing to regulate all this stuff. But then look at the medicines being sold over the counter which probably doesn't do what it says it does and screws you up if you take too much of it. Big business owns the government. If you have enough money to make a big ad campaign, you probably have enough money to buy off—get past regulation, somehow—at least for a while, while you take in the money. It's all the same people trying to rip you off.

This skepticism carries over into "scientific" reports as well. In corroboration of Blendon et al, which found that two-thirds of survey respondents would continue to take a supplement even if the FDA said that it was most likely to be ineffective, 3 of our interviewees who expressed skepticism were specifically dismissive of the findings of clinical trials of supplement efficacy—especially if the studies contradicted their personal experience with a product. For example, we asked Linda, a "sometime" user of supplements, "What if you have used something in the past and think it doesn't really work. Would you continue using it?" She replied, You mean if I had been taking something for a while? I'd probably go with my own experience. Yeah, well, maybe in the back of my mind I might have a doubt for a little while, but I
would probably forget about the study if I thought it was helping. I would doubt the study. You never know what these studies mean anyway, a lot of the time. You always hear about the results of one study questioning another, you know, contradicting each other. There are just so many things that could influence a study, like who was in the study and how it was done.

Two other participants suggested that they were willing to reject findings from clinical trials of the efficacy of supplements because they could not identify with clinical trial participants; they were not like them. For example, Joe told us,

You have to take what those scientists say with a grain of salt. They may be able to tell you what is bad for you a lot better than what is good for you. And I even have doubts about that. I mean, they are comparing big samples of people to big samples of people. Men and women, blacks and whites, and seeing if it works at all for them or if it works better in one group than another. That's how these studies work. But are all white people or black people or 30-year-old men the same? I doubt it.

As these examples illustrate, consumers, wisely, are skeptical of much of the information about dietary supplements that is available to them; however, it is not clear by what criteria supplement users are discerning what information is valid and trustworthy. What is clear is that at least some supplement users—rightly or wrongly—are dismissive of the findings of clinical trials. While doubt in scientific (and other) expertise may be a widespread characteristic of modernity, we suggest that this case must be understood in light of the DSHEA paradox, which—along with the explicitly contradictory information about supplements that is available to the public—has undermined consumers' overall trust in the value and relevance of external sources of information, including clinical trials. Furthermore, this finding has important implications for healthcare practitioners. The disregard by at least some supplement users of scientific findings leaves them vulnerable to taking products that are neither safe nor efficacious. More research is urgently needed on how consumers understand reports of scientific research, as well as how widespread this skepticism is.

Lay Referral Networks

Much of what has been written on medical decision making in the US has been written from the vantage point of patients and practitioners. However, deliberations about what medicines to try, how to use them, and for how long takes place within households and friendship networks—what medical anthropologists have referred to as "therapy management groups." To date, there is neither a network analysis of information flow about supplement use nor any study of how those who take supplements influence others to do so directly or indirectly.

The flipside of our interviewees' inability to identify with participants in clinical trials emerges in their comments about recommendations for supplements within lay referral networks. While at least some of our interviewees are skeptical of the results coming out of clinical trials, many more (21; 35%) seem willing to trust the recommendations of friends, family members, and people they perceive to be like them—people they clearly identify with in important ways. Here we illustrate 2 forms of lay referral networks that appeared prominently in our interviews—women's social networks and intergenerational networks.

Women's Social Networks

Lay referral networks are especially powerful for women, who are the primary consumers of healthcare and the healthcare managers of their families. In a study of women's healthcare decision-making processes, Brown et al found that women had a strong desire to be actively involved in making these decisions. Women in that study actively sought to gather information, and they relied heavily on their social support networks (especially their mothers, spouses, and friends).

In our own research, we found social support networks to be especially strong among menopausal women, who were using friends and family members both to gauge the experience of menopause and to solicit recommendations for how to manage it. For example, Susan, a 53-year-old college professor, explains her seeking of health recommendations from other women at the onset of menopause.

My sister went through menopause a lot earlier than me—when she was in her early 40s. So she told me a lot about it. She used herbs to deal with some of the symptoms, so I heard about them over ten years ago. When I started getting hot flashes I talked to my friends right away because I wanted to figure out how to manage the symptoms. Beginning menopause is like going into labor, you've heard all about it but you're not really sure that's what's going on or how long it's going to last. So you want to get all the information you can, just so you'll know. You want to talk to someone going through it at the time. I was a member of a women's group at the time that my hot flashes started, so there were women of all ages there who had information. Women talk about things that are happening to them like that and are really the experts of their own experience.

As this example illustrates, the exchange of health information among women serves as an important reassurance to women experiencing mid-life health concerns. This exchange offers social support and demonstrates women's care and concern for each other.

Interestingly, along with the advice and recommendations women received from family and friends, women named their healthcare providers as sources of specific recommendations for CAM alternatives to hormone therapy. This finding is striking considering that most CAM studies suggest that patients tell their doctors about CAM use less than 40% of the time. Despite the recent concerns regarding the safety of hormone therapy and the lack of definitive strategies emerging from mainstream medicine for man-
aging menopause, over the last century, women have been socialized to consult their healthcare providers for recommendations and assurances regarding menopause-related therapies. It is likely that this pharmaceutical crisis of care has prompted doctors to search for alternatives, including CAM, to recommend to women who are dealing with menopausal symptoms.

**Intergenerational Networks**

In addition to studying the importance of the horizontal transmission of information about supplements, additional attention needs to be paid to the intergenerational transmission of knowledge and practice. Because women frequently act as the healthcare managers in families, they have tremendous influence over the healthcare decisions of their elders and children; yet we know virtually nothing about intergenerational patterns of supplement (and CAM) use. Time and time again, our interviewees mentioned their mothers as important influences on their supplement use, with their mothers frequently giving them supplements to take—for both general wellness and specific health conditions. Patty recalls her mother and grandmother using herbal remedies when she and her siblings were sick as children and states that this may be the reason for her preference for herbal remedies today. When we asked Nancy, age 50, whether she introduced any of her family members to supplements, she replied,

*Sue*. My husband, his mother, and my elder daughter who just had a baby. And they tried what I have advised. My mother-in-law takes several different supplements now for her arthritis, and my daughter is using herals because she wants to keep breastfeeding and is trying not to use medicines like antibiotics unless she really has to.

Interestingly, it appears that intergenerational transmission moves in both directions. Several young women in our study reported recommending dietary supplements to their mothers and grandmothers.

Of course, women are not the only supplement users influencing family members. Don, age 58, told us,

*I also take MSM—methyl sulfur something. I've been taking this for a couple of months because my father [who is in his mid-80s] said that I should have it with the glucosamine and chondroitin. I figure if it works for him—and he can stand all day, for much longer than I can—then I'd try it. It's a cartilage lubricant. I looked it up on the Internet, because I knew nothing about it, and read the Internet until I felt safe that nobody's dying from it.*

In addition to valuing recommendations from family members or close friends, several interviewees (13; 22%) noted trusting recommendations from those they perceived to be like them in other ways, such as due to a shared lifestyle, practice, or health condition. For example, Joe (who rejected the findings of clinical trials) relies on the recommendations of fellow endurance athletes. He told us, "I believe other people who share my lifestyle—or maybe a doctor who is] into sports medicine. Not some generic study in the newspapers. You have to ask yourself, 'How much alike am I to the average person in the study?'" This suggests a kind of 'biosociality' at work. 

That is, certain people are sharing a sense of body, or assuming a shared sense of embodiment, that is greater with each other than with the general public. Rabinow and Rose have applied the concept of biosociality to refer to the cohesion of groups coalescing around disease that work to provide support, garner resources, encourage research, and affect policy. In the present case, we suggest that biosocial groups may be coalescing around powerful bodily practice, experience, or a sense of the body (eg, yoga, ultrarunning, menopause—rather than just disease) that builds an affinity among participants that is manifested in consumer behavior, and in this case participants' willingness to accept recommendations for supplements from each other.

**Climate of Experimentation**

The multiple and often conflicting sources of information that is available about supplements, together with the ready availability of dietary supplements without practitioner mediation, fosters a climate of experimentation around supplement use. Due to the ambiguity of instructions for use on dietary supplement labels, supplement users often turn to other sources for information and advice about how to tailor products for their specific concerns. Nevertheless, the supplement users we interviewed expressed a great deal of skepticism about the information from most of these sources (including clinical trials), turning instead to the advice and recommendations of family members and friends—people they perceive to be most like them. It is still unclear, however, how supplement users determine exactly what supplements to take, as well as the dosage, frequency, and duration of use. Notably, we found that 14 (23%) of our informants characterized the process of determining their supplement regimen, often explicitly, as an "experiment." For example, we asked Brian how he determined how to use the dietary supplements he takes.

*You read the label and that gives you a general idea of how much to use. After that, it's trial and error. It depends on what you are using it for and what shape you are in when you take it... I just take a big dose and see what happens—like if I think I am getting a cold, I might just really max out on vitamin C and that zinc spray, and maybe echinacea if it were around. I would just take it until I felt some effect. You know just experiment based on how I felt or until I experienced some side effect. If I felt some side effect with stuff I knew helped before, I would just cut back on it. That's pretty much it.*

(Interviewer) *How do you know what you feel is a positive effect of the medicine or a side effect?*  
(Brian) *You just know based on your experience. If it is working you are going to feel something if you take enough of it. You have to experiment with it until you find the right dose.*

52 ALTERNATIVE THERAPIES, MAR/APR 2007, VOL. 13, NO. 2

**Dietary Supplement Use in the United States**
for what you are using the stuff for in the first place. 
(Interviewer) Do you experiment with prescription medicines in the same way? 
(Brian) No. Some of that stuff is really dangerous if you take too much. It can damage your kidneys or liver or do bad stuff. Vitamins and herbals are not that dangerous. It's different. If it is dangerous, they'd make it illegal to sell without a prescription.

Like Brian, several of our subjects clearly linked their skepticism and mistrust of information about supplements with their experimentation. For example, Jason told us,

"People should have the freedom to try what ever they like within limits. It's the government's job to keep poisons off the market and tell us about drug interactions—who else is going to do it? Beyond finding out what's poisonous, big government should butt out. It's my right to try what I please . . . You got to figure it out for yourself by experimenting and talking to people who use whatever. Do you believe the manufacturer of some herbal supplement? Do you believe anyone selling anything? That's the price of freedom, having to figure it out for yourself."

In fact, several of our informants expressed not only the willingness to experiment, but the need to experiment with products and dosages in light of their perceived lack of authoritative information, as well as the ideology of the necessity of tailoring a supplement regimen to each individual. When we asked Susan how she determines the dose of her herbal treatment for menopause, she said,

"That is a good question. It's hard to tell how much you need because everyone is different, and each product has a different amount of milligrams of different herbs—so it's confusing. It's hard to know. The labeling of the product varies so it is difficult to compare across products. You just have to experiment."

As these examples illustrate, there are a number of pragmatic and ideological factors that foster a climate of experimentation around supplement use—each of which is in need of further, more systematic, investigation. These include
1. ambiguity of product labeling and instructions for use;
2. skepticism and mistrust of product information, manufacturer claims, advertising, and media (including reports of 'scientific studies' or clinical trials);
3. misunderstanding of how dietary supplements are regulated (pre- and post-market evaluation and monitoring);
4. inherent trust in the safety of supplements (because they are "natural" and available over-the-counter);
5. ideological drive to tailor or personalize supplement regimen (eg, "Everybody is different."); which may or may not be stimulated by consultation with a CAM practitioner who tailors treatment to individual patients;
6. ideological privileging of personal experience over other sources of information, including "science" (ie, embodied knowledge); and
7. looking for a demonstration effect to indicate effectiveness (eg, "I can feel it working").

Together, these factors contribute to a climate of experimentation and, for some, a process of somatic re-education—a concept that we suggest can be extended to CAM use more generally. By somatic re-education, we mean the process by which individuals become attuned to subtle changes in the body, give these changes meaning (turning them into "embodied knowledge"), and re-privilege these personal interpretations of bodily experience over external assessments (eg, clinical trials, diagnostic testing). The process of somatic re-education may be spurred on by a "health kick" or lifestyle change that entails a number of bundled behavior changes (eg, diet, exercise, supplement use, self-care) producing a noticeable demonstration effect on the body, or it may be initiated by a visit to a CAM practitioner who encourages the patient to pay attention to the body in new ways and provides feedback to indicate that the patient's observations are valuable. We stress here that somatic re-education is not merely self-surveillance in the Foucauldian sense; rather, it is a process of re-organizing and classifying bodily experience and assigning it new meaning. For example, when a patient visits an "alternative" practitioner for the first time, he or she is inexperienced as to what bodily associations are relevant (unlike biomedicine, which has a deeply embedded cultural framework in which the patient is clear about what bodily experiences are most relevant: fever, chest pains, etc). In this case, a practitioner may invite patients to develop their own observations about feelings in the body and will assign some of these observations significance and meaning. In this process, the patient and practitioner build patterns of meaning and re-educate the patient about what bodily experiences and observations he or she should pay attention to and how to assign them meaning. It may be that this process also builds a kind of biosociality among users of different treatment modalities, who share a sense of embodied knowledge and attribute meaning to bodily experience and feelings in similar ways. Paradoxically, healthcare consumers are simultaneously being bombarded by advertisements for pharmaceuticals with extraordinarily long lists of side effects that may serve as biomedical re-education, numbing consumers to the risks of pharmaceuticals.

CONCLUSION

Our work is supportive of a pharmaco-epidemiological agenda and is attentive to studies of lay epidemiology. Specifically, this paper has been motivated by 3 intersecting research issues that emerged during pilot interviews with dietary supplement users. First, we know virtually nothing about user compliance with labeling instructions for dietary supplements. DSHEA regulations governing the labeling of supplements further complicate our understanding of this issue. Second, we know little about how consumers gather, interpret, and trust
information about supplements as provided by the producers of products, the scientific community, the media, and lay sources. At issue is the not only the extent to which the public feels each party is motivated or impartial, but also the extent to which they are talking about the same dimensions of health and the body. Together, these issues make apparent the urgent need to consider the issues of supplement safety and benefit in terms of both efficacy-safety trials of fixed doses in controlled settings and the ways supplements are used in the real world as stand-alone products in varying doses, as well as with other medicines and supplements. We have examined data, collected from exploratory interviews with dietary supplement users, for insight into topics in need of further, more systematic, exploration.

The supplement users we talked with made clear to us that the current clinical trial research paradigm is ineffective for understanding the "real world" safety and benefit of dietary supplements. Not only do supplement users question the information coming out of these studies, but their patterns of use are so unlike those of the research setting that they do not adequately approximate how supplements are being used in context—that is, not in isolation, but as part of packages of treatment that include diet, exercise, and supplements used in combination with other supplements and pharmaceuticals. Clinical trials of supplements also fail to account for the experimentation inherent in supplement use. Furthermore, current studies of patterns of supplement use—based primarily on survey data—have been concerned with the overall prevalence of supplement use in populations and have largely ignored micro-scale patterns of use, such as dosage, frequency, and duration of use.

We contend that there is a dire need for qualitative and innovative research designs to assess real-world supplement use and to assess the effectiveness (not just efficacy) of supplements as part of whole packages of behavior change, in context. Specifically, this would include studies of the following.

Patterns of use in context—To determine the safety and effectiveness of dietary supplements in the real world, researchers need to turn their attention to how supplement users experiment with products (alone and in combination) and determine dosage and frequency and duration of use, including a consideration of cyclical, intermittent, and seasonal supplement use that many studies miss. It would also be important to investigate supplement users' immediate motivations for use—that is, why now is the time to start/stop use of a particular product (or group of products). Finally, studies of supplement use in context must consider the way supplements are used in combination with other dietary supplements, with pharmaceuticals, and with larger health-seeking or lifestyle changes.

Network effect of supplement use—Studies of dietary supplement use would benefit from careful network analyses—specifically, those that consider the "ripple effect" of supplement use: How many people are influenced when one person tries a product? Who is influenced? Studies along these lines should consider influences on friends and family—especially the upward and downward intergenerational flow of recommenda-

ions and the positioning of women as healthcare managers. Furthermore, these studies should consider the influence of biosocial networks on dietary supplement use.

Translation and transmission of information—In order to address concerns about supplement users' adherence and compliance to product instructions, researchers need to look beyond product labeling and investigate the ways that users explain supplement use to others, including the interpersonal (lay) instructions for use that they transmit to each other. This research priority bridges patterns of use in context and network effect of supplement use, concerning itself with the ways that network recommendations influence patterns of use in context.

Because dietary supplements are so widely used and so easily accessed, both researchers and healthcare providers need to be aware that current research on dietary supplements does not adequately approximate the way these products are used in the real world. In addition to researchers moving forward on a "real world" research agenda as outlined here, it is vital that healthcare providers ask patients not only whether they are using dietary supplements, but also how they are using them (in terms of dosage, frequency, duration, and combinations of use).

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REFERENCES
5. Nicher M. Research on complementary and alternative medicine: what does medical anthropology have to contribute? Paper presented at: 2006 Annual Meeting of the Society for Applied Anthropology (SAA)/Society for Medical Anthropology (SMA); April 1, 2006; Dallas, Texas.

15. Murphy SP, Wilkins LR, Hankin JH, et al. Comparison of two instruments for quantifying intake of vitamin and mineral supplements: a brief questionnaire versus three 24
Dietary Supplement Use in the United States

49. 48. 47. 46. 45. 44. 43. 42. 41. 39. 38. 37. 36. 35. 34. 33. 32. 31. 30. 29. 28. 27. 26. 25. 24. 23. 22. 21. 20. 19. 18. 17. 16. 15. 14. 13. 12. 11. 10. 9. 8. 7. 6. 5. 


Altern Ther Health Med.

World Health Organization.

Psychiatry.

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