Preparing a paper of this breadth was quite intimidating. First, I don’t consider myself a philosopher of science, rather a scientist who is a student of philosophy. So, in preparation of this paper, I decided to seek the highest and purest of philosophical thinking. With this in mind, I consulted one of the most profound sages of our time... Winnie-the-Pooh. For those of you who are a little skeptical about the Great Bear’s status as a philosopher, let me remind you that Winnie-the-Pooh, although he had many friends, lived in the woods all by himself. Now, according to Aristotle, to live alone under these conditions one must be either an animal or a god. But Nietzsche tells us that there is a third case where one must be both animal and god—a philosopher (Williams, 1995, p. 151). Furthermore, Pooh, in his Anxious Pooh Song, claims, “Pooh is a Bear of Enormous Brain!” Now, if that isn’t proof that he is a philosopher, I don’t know what is! I had some help in my attempts to relate Pooh’s philosophy to the philosophy of science from John Tyerman Williams in Pooh and the Philosophers. The wisdom of this great ursine philosopher will be integrated within this paper.

The purpose of this paper on knowledge building for the health sciences in the twenty-first century is: (1) to present an overview of paradigms of philosophy of science informing our approaches to science; (2) to present an analysis of the current forces impacting health care that have implications for knowledge building in the health sciences; (3) to articulate some values-oriented tensions within the analysis of these contexts and to describe a synthesis of those tensions; and (4) to conclude with a vision for knowledge development in the next century.

Paradigms in the Philosophy of Science

Knowledge development is informed by philosophies of science. It used to be that when we talked about “science” we all knew what we meant. That is no longer the case. The philosophy of science is evolving, and we are moving away from a reliance on the assumptions of positivist philosophy of science and towards expanding philosophies of the post-positivist or postmodern era. Thomas Kuhn (1970) described paradigms as world views that cluster the foci of inquiry in
scientific disciplines. In this general sense, we have paradigms in philosophy of science. These paradigms are ontological, in that they are structured around fundamental beliefs about the essential nature of reality and existence. These ontological beliefs give rise to epistemological or knowledge beliefs and methodological assertions or approaches to the scientific enterprise. These paradigms frame our conduct of science based on the answers to the following questions: What was the context that gave birth to this paradigm? What is the nature of reality? What is the nature of scientific knowledge? What is the place of the subject or scientist in scientific inquiry? What is scientific truth? And, finally, What are the unresolved issues in this paradigm? Four of those paradigms will be described: they are empirical-analytic; phenomenological-interpretive; critical-poststructural; and unitary-integrative. Each one will be described and differentiated in the context of the questions above.

The Empirical-Analytic Paradigm

The first is the empirical-analytic paradigm. We have been educated about science through this paradigm since grade school and certainly as we were mentored as researchers and practitioners. Science has come to mean a certain kind of knowledge that is obtained through a “process in which observable, verifiable data are systematically collected from the world through our senses so that we can describe, explain, and predict events” (Wilson, 1989, p. 2). This general paradigm has reigned in defining science and its activities since the seventeenth century and is still the predominant paradigm of philosophy of science. We must remember that the separation of science from philosophy actually came in the seventeenth century. Before that time, for example, at the time of the Greek philosophers, science was natural philosophy. Science, then, was a form of philosophy. Empiricism grew from the context of this conglomerate of knowledge about art, philosophy, metaphysics, alchemy, and of the natural world. The recognition of the dangers of relying on personal knowledge or opinion as truth about the natural world, and a desire to be more effective in prediction and control of the natural world, characterized the movement toward empiricism.

In the empirical-analytic paradigm, knowledge is meaningful if and only if there is some way of testing it. Thus the principle of verifiability was built on the hallmarks of empiricism and dismissed anything aesthetic, philosophical, or metaphysical as simply meaningless. Sir David Hume, in An Enquiry Concerning Human Understanding, said,

If we take in our hand any volume; of divinity or school metaphysics, for instance; let us ask, Does it contain any abstract reasoning concerning quantity or number? No. Does it contain any experimental reasoning concerning matter of fact and existence? No. Commit it then to the flames: for it can contain nothing but sophistry and illusion. (Qtd. in Williams, 1995, p. 93)

In the empirical-analytic paradigm, reality exists independent of the observer. Scientific knowledge is discovering the true nature and laws that govern the behavior, processes, and elements of this independently-existing natural world. This is accomplished through methods of reducing reality to elements or measurable units and removing all possibility of subjective contamination, which forms bias. The subject, then, is a source of bias, or a contaminant in the discovery of scientific
truth. Scientific truth is void of subjectivity, is quantifiable, and is defined by laws of probability.

One episode of *Winnie-the-Pooh* describes Christopher Robin's expedition to the North Pole. Pooh asks, “What is the North Pole?” (modeling Socratic dialogue, of course). Christopher Robin states that the North Pole is something you discover, “That is, it is something objectively existing, quite independently of any observer or discoverer” (qtd. in Williams, 1995, p. 30). This is the essence of empiricism. The North Pole, a symbolic representation of the “ultimate constitution of the universe,” exists independently of any observer (Williams, 1995, p. 34). The scientists’ role is to discover its nature. In the tradition of empiricism, we are challenged to continue to test our observations until we can be certain of them.

In the empirical-analytic paradigm, we use inductive and hypothetico-deductive processes to discover truth. Again, let’s go to the great ursine sage to understand the hypothetico-deductive process. Pooh had a jar labeled as “Hunny”; his hypothesis, deduced inductively from multiple experiences, was that the jar contained honey. “But you can never tell,” Pooh said. Here, he exhibits the critical mind of the scientist. He must test his hypothesis. So he puts his tongue in, takes a large lick, and confirms that it is honey. However, one observation is insufficient. He notes that somebody may have put cheese in the jar and it may be at the bottom, an alternative hypothesis. In this paradigm, it takes multiple observations to have confidence in scientific truth. We must note that Pooh exposes his hypothesis to disconfirmation, a Popperian approach to science (Williams, 1995, p. 74). Any statement that is scientific must be capable of being falsified. This separates the scientific from the metaphysical. Pooh continues to test his hypothesis that there is honey in the jar until the honey is all gone. Then he can have confidence in the truth that the jar was full of honey. The laws of science are those that “contain such a high degree of probability that we are justified in relying on them” (Williams, 1995, p. 117).

Let’s apply this approach to a hypothesis that may have relevance to this audience: that exercise results in cardiopulmonary benefits is a scientific hypothesis. If we define our variables for cardiopulmonary benefits and measure them, controlling for the confounding variables of age, other compromising health behaviors, and health status, we can design an experiment and come to some findings that ultimately support or reject our hypothesis. According to the empirical-analytic paradigm, this is a way of arriving at scientific truth. On the other hand, the hypothesis, “Those who exercise are closer to God than those who do not,” is nonscience. We cannot test it in any way. Isn’t it interesting how nonscience is so close to nonsense, or knowledge that is dismissed as meaningless?

Let’s summarize the characteristics of the empirical-analytic, the dominant paradigm in philosophy of science: there is an objective reality; there is a separation of the knower from the known in scientific discovery; scientists use quantifiable measurement to reduce phenomena; there is reliance on probabilities and repeated testing to ascertain laws or truths of science. The essence of this paradigm of science can best be captured in the phrase “radical objectivity.”

Anomalies in the Empirical-Analytic Paradigm

As I said earlier, the empirical-analytic paradigm of philosophy of science was the only view of science until this century. The problematic areas or anomalies related to this paradigm gave rise to other paradigms, so let’s spend some time
examining these anomalies. The first problem is whether or not the model and the methods of science in this paradigm really help us to understand the truth. That leads us to the question, “What is truth?” Again, we can consult the Great Bear for some wisdom related to this issue. Pooh is continuously and ardently seeking honey. Great philosopher that he is, we know that the true meaning of all this honey-seeking activity is the search for truth: “Honey is a long-standing symbol of the highest spiritual, intellectual and social values” (Williams, 1995, p. 107).

We all share in this search for truth: scientists, humanists, philosophers, artists. This use of honey as a metaphor for truth is also adopted by Robert Veatch in his philosophical work Two Logics. The honey metaphor helps us to understand some of the differences between the search for truth using methods based in the empirical-analytic paradigm of science and the search for truth through other ways of knowing, such as the humanities and art. In Veatch’s parable, the differences between the two are represented by the images of spiders and bees. Spiders symbolize the traditional scientists who weave their webs of logic and theoretical formulations in order to trap the fly, which represents some aspect of reality. The webs are creative and beautiful, spun from the spider herself and working well to nurture and continue the work of the spider. But what the spider captures is dependent upon the placement, design, and size of her web. In contrast, the bees, representing the humanists or artists, create truth (honey), from gathering the gifts from the flowers, the fruit of the world we live in. The bees stop at each flower, taking in the experience of being in the world, and creating from it the sweetness and light of truth.

Perhaps some of the truths that are essential to the understanding of phenomena within scientific disciplines cannot be captured by the webs of traditional science. Perhaps some of the questions must be approached in a different way. Pooh, understanding these differences, quips, “the wrong sort of bees . . . make the wrong sort of honey” (Williams, 1995, p. 12). And so the foundational philosophies, methods, and truth criteria within the empirical-analytic model of science may lead us to the wrong sort of truths for the study of some phenomena and for some of our questions.

The Phenomenological-Interpretive Paradigm

In the context of these concerns, the phenomenological-interpretive paradigm of philosophy of science was born. Those studying the experiences, behaviors, and life patterns of human beings were acutely aware of the limitations of empirical science. In the late 1800s, Wilhelm Dilthey coined the term “human sciences” to distinguish this focus from those of the natural sciences. He was concerned with the “sterile empiricism that disconnected life from knowledge” and with “the trend to regard human behavior and culture as susceptible to the methods of natural science,” which “stripped life of human meaning and purpose” (Mitchell & Cody, p. 54). For Dilthey (1977), the human sciences approach to preserving the fullness of human experience and meaning was the most authentic way of apprehending these truths. According to Dilthey, humans were the source of knowledge about their experiences, and the subject matter of the human sciences is “the interrelation of life, expression, and understanding” (Dilthey, 1976, p. 175). Here, the scientist is fully interpretive and part of what is investigated. Reality is an interpreted or coconstituted reality; reality is “the meaning of reality.” In the interpretive
paradigm, scientific knowledge is cocreated through the interpretation of sensory experience.

One of the first to take Dilthey’s ideas and integrate them into the methods of science was Amadeo Giorgi (1970), a psychologist. Giorgi agreed that the approach to inquiry into the human realm was based on different assumptions. He approached the study of humans through a phenomenological method of seeking to understand an experience as it is lived. Since Giorgi’s articulation of interpretive approaches, we have witnessed an explosion of these methods within psychology, anthropology, education, nursing, and in movement sciences.

Fahlberg and Fahlberg (1994) state that the recognition of the value of what I am calling the interpretive paradigm did not come from the study of philosophy of science but from the scientist’s and practitioner’s experience of anomalies that could not be addressed through the ontologies and epistemologies of the empirical paradigm. Stream and Eklund (1995) discussed the value of qualitative methods for conducting research in the psychology of sport and physical activity in providing the benefits of description, interpretation, verification, and evaluation. Questions such as the study of children’s sports experiences provide exemplars. “What is the meaning of exercise for people who exercise relentlessly as compared to those who will not adhere to even the most gentle regime?” “Confrontation with these questions forced a recognition that methodologies adopted from the physical sciences are no match for addressing this human complexity” (Fahlberg & Fahlberg, 1994, p. 101). Fahlberg and Fahlberg quote Rintala (1991), who states that the focus of inquiry is “not just on the movement of the human, but also on the human who is doing the movement” (p. 101). In the interpretive paradigm, the subject’s experience of the phenomenon of concern is the major source of data. Methodologies such as phenomenology, hermeneutics, and ethnography have emerged within this paradigm.

Let’s consult Pooh to try to understand the phenomenological-interpretive paradigm. In one chapter our friend is clinging to his helium balloon in his airborne search for honey. “His arms were so stiff from holding on to the string of the balloon all that time that they stayed up straight in the air for more than a week.” Here, we see an image of how the search for truth through the wrong methods of science can leave us paralyzed by habit, clinging to ways of seeking truth that cannot and do not advance our knowledge-development enterprise (Williams, 1995, p. 15).

At this point, I’d like to summarize the characteristics of the phenomenological-interpretive paradigm: reality is cocreated through an interpreting subject; the meaning of experience is the focus of inquiry; truth is subjective, context-dependent, and value-laden; methods seek common meanings and shared themes; data are qualitative descriptions. The phrase “radical subjectivity” captures the flavor of this paradigm.

The Critical-Poststructural Paradigm

The critical-poststructural paradigm will be discussed next. The critical paradigm includes critical theory and poststructural conceptions of science. The rise of the critical approach came from “the quest to gain in-depth understanding of the dynamics of the contemporary human condition in social and political contexts” (Ray, 1992, 98). Reality and knowledge of that reality is constructed within historical, political, economic, and social systems, and the values inherent within
these systems are reflected in what we call scientific truth. The search for truth in the critical paradigm is seeking to uncover these contextual assumptions that are implicit in what we call scientific knowledge. One particular flavor of the critical approach is feminist critical theory, which examines the patriarchal influences of the processes and products of science. The invisibility of women as research subjects who became recipients of research findings is one issue. The domination or manipulation of research subjects for the purposes of science has been recognized and has led to the “protection of subjects”—which, in itself, is still a patriarchal conception.

Critical philosophy shares a human science perspective, but it extends it. It has its foundations in the philosophies of Marx, Hegel, and Gadamer, but has been refined, synthesized, and clarified by Jurgen Habermas. The core idea in the critical paradigm of science is that concepts cannot make sense unless there is rational evaluation made by participants in community life. Rational evaluation involves a process of coming to consensus through lack of coercion and manipulation. “The core of critical theory is the notion of emancipating people from conscious or unconscious constraints to facilitate, by uncoerced negotiated agreement, the making of community life” (Ray, 1992, p. 98). Knowledge is constructed within the context of political spheres, and this knowledge is imbued with meanings that can advance an economic and political agenda. Habermas contended that critique is a distinctive form of knowledge with its own epistemological integrity, and he believed that every group fostering inquiry is located in a social and historical context that influences the knowledge produced.

What we study in science and how we study it creates or exemplifies existing oppression within society. Part of the enterprise of science in the critical approach is to uncover this hidden oppression for the purposes of emancipation. Is our science of health promotion focusing on the economic realities of the middle class: nutrition, exercise, and lifestyle change? And does this emphasis on individual choice and lifestyle for health really serve to release society from any responsibility for the health of its members? A critical approach to inquiry may examine the research on exercise and health, uncovering the social, cultural, and political assumptions that frame the knowledge generated for the purposes of liberating those oppressed by this knowledge. Another exemplary question is, Does our emphasis on weight loss and that a certain weight is optimal, feed society’s vision of ideal women as small, helpless, frail, and invisible?

In the poststructural analysis, knowledge is a product of power relationships. “Knowledge and power are viewed as mutually-generative, that is, knowledge initiates power and power generates knowledge” (Dickson, 1990, p. 22). In poststructural approaches, we analyze the discourse to reveal dimensions of the power and resistance within the knowledge claims that we call science. “In the end, we are judged condemned, classified, determined in our undertakings, destined to a certain mode of living or dying, as a function of the true discourses which are the bearers of the specific effects of power” (Foucault, 1980, p. 94). The discourses related to what we have come to label “science” have been shaped by power relations. One example is the medicalization of natural processes such as menopause and childbirth through scientific claims. In poststructural analysis, there is an unmasking of the social discourses to reveal the power/knowledge dynamic. Pooh, in his more insecure moments, called himself “a bear with very little brain.” Therefore, when he decided to give Eeyore his empty honey pot as a birthday
present, he sought the most authoritative presence in Hundred Acre Woods, Owl, to write "A Happy Birthday" on it. Owl, accepting the authority and power conferred on him by his social system, asked Pooh if he could read. Discovering that he could not, Owl confidently wrote, "Hipy Papy Bhuthdth Thuthda Bhuthdy," telling Pooh that it said, "A Very Happy Birthday with Love From Pooh." And Pooh took this knowledge on Owl's authority. Without raising people's consciousness and empowering them to be their own knowledge brokers, disciplinary power can distort and influence what is accepted as knowledge.

In summary, in the critical-poststructural paradigm of the philosophy of science, scientific knowledge both shapes and is shaped by the cultural, political, economic, and social discourses in society; scientific knowledge is fallible, representing the best explanations available, and the explanation that people trust enough to act upon (Dickson, 1990); methods incorporate unmasking the assumptions of the researcher and the power relations within the discourse and the disciplines in order to make explicit how power permeates the construction and the legitimation of knowledge (Lather, 1991, p. xvii). "Radical contextualism" is the hallmark of this paradigm.

The Unitary-Integrative Paradigm

The final paradigm of the philosophy of science that I will discuss I have named the unitary-integrative. This paradigm emerged from an ontology that, interestingly, was explicated from the theoretical assertions and empirical findings of relativity theory, quantum physics, and holography. In this way, the radical new discoveries about the nature of reality from physics informed our epistemic and methodological conceptions. Nursing was one of the first disciplines in the health sciences to acknowledge the transformed landscapes of reality emerging from these discoveries. In the early 1970s, Martha Rogers, a nursing theorist, described this alternative world view and its meaning for our approaches to science and health care. Physicist David Bohm (1980), in his descriptions of the implicate and explicate orders as manifestations of reality, awakened other sciences to the importance of this perspective.

The basic assumptions in this paradigm are in the interconnectedness of humans with each other and the environment; the paradoxical nature of reality as both matter and energy all at once; and fundamental uncertainty due to the dynamic quality of the universe and the impact of observation on what is observed. While it seems impossible to apprehend this dynamic, unitary, interconnected whole, the whole can be understood through patterns, through glimpses into the nature of the whole. Negentropy refers to the evolution of human existence that manifests in an increasing complexity and diversity of behaviors, patterns, and life forms. This presupposes the emergence of manifestations in human life that will continue to surprise us. We are participants in a universe that is not bound by linear time and three-dimensional space.

For David Bohm (1980), the implicate and explicate orders are expressions of an undivided wholeness. The implicate order is the unseen; it is beyond sensory accessibility, a pattern of dynamic energy that underlies all of nature. The explicate order is that expression or manifestation of the implicate order that is accessible to us. The explicate is enfolded in the implicate; the explicate unfolds from the implicate. This dynamic process is called the "holomovement." The as-
Assumptions within the empirical-analytic paradigm of objectivism, positivism, and reductionism (Harman, 1987) are inconsistent with the unitary-integrative philosophy of science. Because there is no real separation between person and environment, knower and known, consciousness and matter, the knower does participate in what is known. The assumption that what is real is observable is turned upside down by this paradigm. What is not observable is just as real as what is; in fact, what is not observable may have primacy over (or give rise to) what is observed. In this way, consciousness, subjectivity, and experience are legitimate realms of study.

Willis Harman (1987) offers an integrative view of science that extends this unitary view, suggesting an approach that acknowledges the unitary tenets described above, while offering a solution to the frustrating conclusion that the whole can never be grasped in an ever-changing, uncertain, paradoxical universe. Harman's (1987) complexity science and Ken Wilbur's (1997) “integral” view have great promise for scientists of the next century. Harman describes four levels of phenomena whose epistemic assumptions are fundamentally different, leading to different purposes and modes of inquiry. These four levels are: physical sciences, life sciences, human sciences, and spiritual sciences. "If characteristics emerge at higher system levels that are qualitatively different from those at lower levels, then the sciences appropriate to different system levels will be qualitatively different" (Harman, 1987, p. 11). He asserts that there need be no claim to exclusivity in terms of which level is ultimately "real." "Reality is too rich to be fully expressed in any model, theory, metaphor or equation" (Harman, 1987, p. 11). The models are complementary, not contradictory, and furthermore, the person does not become "a schizoid personality" for holding both views at the same time (Harman, 1987, p. 11). Harman, then, affirms that the "spiritual questions" considered to be outside the realm of science are not only within it but are, perhaps, our most essential questions. But in complexity science, methods are dependent on the level to be studied, the questions that are asked. The interaction of observer and observed is less problematic at the physical level than at the higher level, such as the spiritual level. Harman asserts that it has been commonplace to reduce the spiritual phenomena to the physical but less common to "look upward" to examine the physical as a manifestation of the spiritual.

One usefulness of complexity science is that the physical sciences, life sciences, human sciences, and spiritual sciences (all approaches and not sciences) allow us to enter the realm of understanding phenomena at different levels, seeking credible knowledge at each one. For example, the study of exercise in postmenopausal women may be studied from an understanding of the physical benefits of exercise to serotonin levels and bone density. From a life science approach, we may consider how exercise relates to the strengthening of the immune system to enhance coping with multiple life stressors encountered in later life. From a human science point of view, we may seek to understand the experience of exercise for women or how it relates to the strength, power, and self-control often diminished in gender definitions of role. From a spiritual perspective, we may seek to understand how movement relates to expanding consciousness, an enhanced awareness of connectedness with the sacred. Each of these perspectives provides a window into the complexity of the phenomenon of exercise for postmenopausal women. Through integration of all the perspectives, we reach the most complete or holistic understanding of the phenomenon.
One day Piglet opened his door to find Pooh walking in circles in the snow in front of his door. When Piglet asked Pooh what he was doing, he said, “Hunting.” “Hunting what?” asked Piglet. “Tracking something,” responded Pooh. They agreed that they saw paw marks in the snow and concluded that it must be a Woozle. They had never seen a Woozle, but depended on the pattern of tracks to lead them to the discovery. As they circled, they saw more tracks in the snow and concluded that additional Woozles were joining the pack that they followed. Christopher Robin, who was perched on a tree above the tracks, was able to recognize the pattern and show them how they were following their own footsteps. Other than the obvious interpretation that following your own tracks leads to tautological thinking (this is the empiricist interpretation), we can see an illustration of how examining the pattern through seeking a metaperspective can lead to a clearer understanding of the whole.

In summary, the unitary-integrative philosophy of science provides a view of reality that is characterized by interconnectedness and flow; an appreciation of the patterns of the whole and the mystery enfolded in the unseen. The complexity of phenomena may be best approached through multiple approaches to inquiry that are integrated in the quest for understanding. This approach is characterized by radical integration.

A New Definition of Science

The purpose of this analysis of paradigms of philosophy of science was to illustrate the expanding definitions of science that will accompany us in the next century. A new definition of science is needed, one that transcends all four paradigms, yet distinguishes science from the humanities and arts. “Science seeks an understanding of specified phenomena through creating some unifying or organizing frameworks about the nature of those phenomena. In addition, science evaluates these frameworks for their empirical honesty” (Smith, 1992, p. 50). This definition is open enough to encompass the multiple paradigms of science that will accompany us into the next century.

Five Trends in the Health Sciences

Next, I’d like to describe some trends that will continue to impact the health sciences in the next century. In a February 1997 article in Healthcare Forum, Allawi (1997) identifies five forces impacting health care. These forces also impact the health sciences. This, in itself, is an important trend: perhaps more than in any other time of our history, the forces of practice are directing the practice of science, for better or worse.

The Marketization of Health Care

The first trend is no surprise: it is the “marketization” of health care. We have seen health care becoming a profit-making medico-technological complex. This force “brings higher expectations for performance, and thus greater accountability—not only with respect to consumers, but also to other well-informed constituencies” (Allawi, 1997, p. 49). These are often financial expectations. There
is fluidity and opportunity for the emergence of innovation with new industry. Physician management firms, integrative healing centers, medical equipment suppliers, and fitness counselors are examples of innovations supported by this marketization. On the other hand, the specter of downsizing—replacing qualified with less qualified staff, cross-training personnel, and dangerous staffing patterns—have created concern about the focus on cost-containment to improve the competitive edge while deemphasizing quality of care and quality of life issues. There is a destabilizing of the provider’s control of health care. The ethical and moral instability of health care decision-making emerges in a milieu in which the reigning value is cost containment.

What does all this have to do with the state of the health sciences? Health professionals are experiencing increasing pressure from managed care organizations to prepare a different kind of practitioner. One example is the emergence of midlevel primary care providers, nurse practitioners, physician assistants, nurse midwives, even doctors of pharmacy to care for normal, everyday health concerns of people. We are seeing an increase in primary care physicians as compared to specialty physicians. Executives of managed care organizations (MCOs) are at the table, providing input about the curriculum with university faculty. Since MCOs employ 60% of all practitioners, their voices are powerful. There have even been veiled threats of opening their own schools for health professionals. Greater accountability has created an emphasis on the evaluation of interventions, with a focus on the funding of outcome studies. Also, the use of the most effective interventions is evidenced in the development of disease management protocols and the newest wave in evidence-based practice.

The Rise of the Consumer

The second trend is the rise of the consumer. “There is a definite shift toward the true health care consumer as the central decision-maker. Consumers are better informed and more assertive than ever with respect to their healthcare options” (Allawi, 1997, p. 49). Employers are creating more options for their employees, including health-care vouchers that give employees full discretion in how they allocate the funds (Allawi, 1997). The better educated and informed consumer is demanding greater choice, quality, service and price.

This consumer involvement is driving health care away from traditional, event-focused, acute care models and toward prevention, wellness, quality of life issues, and alternative care. Eisenburg and his colleagues (1993), in a now-classic article that appeared in The New England Journal of Medicine, stated that about one-third of consumers use alternative methods of care. The National Institutes of Health established an Office of Alternative Medicine, and integrative health and healing centers are popping up throughout the country. Conventional approaches to treatment are not effective with many of our current health problems. Humanizing practices like childbirth education, birthing centers, and hospice came from the grassroots demands of consumers. School-based clinics and community health centers are movements that locate the focus of health care delivery closer to the recipients of care. Ninety-one percent of major health insurers are now offering some kind of fitness program; 97% are offering some kind of stress management. “Health care companies will increasingly stand or fall on the basis of their ability to improve the health status of the target population” (Allawi, 1997, p. 50).
For the health sciences, this means an opportunity for research in demonstrating the connection between those health promotion practices and increases in functioning, health outcomes, morbidity, and cost. The practitioners previously on the periphery, such as those dealing with prevention, health promotion, and healing, are moving into the mainstream of the health sciences. There will be an increasing need for legitimizing study in many of these areas through the establishment of researcher-practitioner partnerships.

**Tailor-Made Health Care**

The third trend relates to the first two; Allawi (1997) refers to it as tailor-made health care. Again, this relates to a greater differentiation of health care services according to population needs and individual customer preferences. This means developing an intimate knowledge of the population needs, and flexible product and service lines with variable costs. For example, what programs are developing that respond to the violence and abuse in our communities; the aging baby boomers; environmental pollution of our water, air, and food; and increasing cultural diversity?

This trend relates to the enterprise of science through the development and testing of innovative services, delivery systems based on interdisciplinary relationships, and partnerships with the communities we serve. Our research initiatives within the health sciences must respond to rapid changes in our population profiles.

**Restructuring Health Care**

Restructuring inside and out is the fourth trend. Accelerating change is creating chaotic climates. New structures of organization must be flexible, horizontal, work-group-oriented, and promote networking, collaboration, and quick responsiveness. Externally, we are seeing integrated systems of care, with one organization providing primary care, acute care, and home care. In Minneapolis, a very mature managed care market, we are seeing three regional systems covering 78% of managed care lives (Allawi, 1997). These same qualities will characterize our scientific enterprises through less isolation of disciplines. Multiple disciplines must come together to focus on significant research problems related to health while preserving the particular strengths of the disciplinary perspectives. The greater integration of practice and research initiatives will provide rich interdisciplinary teaching opportunities.

**The Impact of Technology**

Probably the trend that is in our consciousness most prominently is technology. It is hard to imagine how we conducted our work in the days of using punch cards to enter data and run analysis programs. How did we exist before we could communicate by e-mail or collaborate via list-serve discussion groups? “It is difficult to overestimate the impact of the information revolution on health care” (Allawi, 1997, p. 51). Although technology has the potential for alienation and dehumanization, it can give us the time to focus more on relationships, to facilitate client involvement and choice, to remove geographic barriers, and to improved the quality of care. Technology will have a central place in all health care delivery systems of the future.
The place of technology in science is self-evident. We will see a greater percentage of our budgets go to upgrading and securing the most relevant technology for our research. We will communicate our findings to fellow professionals and consumers and collaborate with others instantaneously.

A New Synthesis: Conscience, Community, Consciousness?

Now that we've examined the context of multiple paradigms of philosophy of science and the trends impacting health care and health sciences, it is time to identify some of the conflicts or tensions in values embedded in this context. These conflicts represent the tensions between modern and postmodern perspectives and may be framed as the following: the conflict of biomedical technology with human dignity; of disciplinary specialization with integration across fields; of health as optimal functioning with health as a self-defined quality of life; of the body as machine with human beings as unitary wholes; and of scientific freedom with social responsibility. The natural posture toward the articulation of these tensions is to choose a side, and in this choosing the opposition becomes the enemy. This dualistic thinking polarizes us and will not serve us in the twenty-first century. Rather, a mosaic of ontological and epistemic systems will lead us in embracing the best of all perspectives, seeking some common ground, and transcending our differences toward coexisting in diversity and pluralism (Preston, 1992, p. 13).

I've attempted to construct a synthesis of these tensions that both embraces and transcends these polar opposites.

The synthesis can be described in terms of three concepts: conscience, community, and consciousness. Conscience refers to the interrelationship of science and values in the scientific enterprise. Community refers to connections with others in the development or sharing of knowledge. Consciousness refers to the place of creativity, meaning, intention, and choice in knowledge development and practice.

Conscience

Through a renewed conscience in the health sciences we will commit to an authentic mission of health care for all. Our call to care is a call to preserve human dignity, choice, and diversity in our practice and research. Health is viewed from multiple perspectives, but it includes the self-evident reality that people define their health and quality of life from their personal, cultural, and social world views. There is not one standard for all. Our challenge is to refocus our practice and develop our knowledge toward approaches that honor the uniqueness and the lifestyles of each person. From this perspective, our obsession with compliance is called into question, for compliance places the person in the mode of passive recipient rather than active cocreator of health. Jean Watson (1995, p. 64-65), one of the most prominent voices for the new conscience, states that

we have often allowed biomedical knowledge alone to define for us ethical and moral issues of being a scientist or a . . . [health] professional, and even what it means to be human. But we now see that such a model cannot accommodate many of the phenomena that concern [us] regarding human health-illness experiences and caring-healing processes.
Marshall Becker, one of our leading medical sociologists and coauthor of the Health Belief Model, presented a provocative critique of our approaches to health promotion. He says that we have created people who are anxiety and guilt-ridden, feeling an overwhelming responsibility for their health. Becker (1993) says,

Perhaps the most harmful side of our health promotion appeals has been the creation of an epidemic of apprehension wherein our almost-daily frightening declarations warn that danger lurks in every aspect of our lives: the air we breathe, the water we drink, the food we eat, the homes we live in, the substances we touch and the work we do. In efforts to encourage society to adopt our suggestions we often sprinkle liberal quantities of fear arousal as a kind of motivational seasoning on our messages; this frequently generates considerable concern, but little subsequent behavior change, with the net effect of converting “persons at risk” to “anxious persons at risk.” (p. 2-3)

Even if people make the lifestyle changes that we prescribe, can we say with certainty that they live that much longer? Becker cites a study that found that rigidly adhering to the guidelines for cholesterol consumption leads to increasing life span from a few days to a few months in low-risk people and a few months to a maximum of one year in high-risk people (Taylor, Pass, & Kamaroff, 1987). And what of the quality of their lives? Furthermore, he asserts that the emphasis on self-responsibility has served to abdicate the social responsibility for poverty, homelessness, marginalization, and inequitable access to health care, which are equally important predictors of the health of our populations. Becker cites a study by Levin (1987) that notes that a small increase in education or economic level for an individual or population has a much greater impact on health than all of our health resources combined. Is health promotion as a lifestyle change a middle-class concept that has little meaning for those in the margins? Finally, Becker notes that the individual responsibility for health may reflect a new morality whereby health is linked to one’s character and worth. The obese “let themselves go,” the smokers “have no will power,” and the “nonaerobics” are “lazy” (Becker, 1993, p. 4). This is translating into a movement to have these people pay more for their health care because of their character flaws. Kilwein (1989) said, “I’ve never heard it suggested that patients with ‘self-inflicted’ disorders resulting from undereating or from overworking be charged more for health care” (p. 9).

Certainly, I am not denying the benefits of living a balanced lifestyle for enhancing the quality of life; however, sitting in judgment or blaming others is not the answer. Conscience does not relinquish our responsibility to continue to develop knowledge about the determinants of health and well-being, it only extends our focus toward the priorities of the populations that we serve. Through a transformed conscience in science, we will seek knowledge for more than its ability to control, predict, or even cure. We will value it for its ability to provide us with insights into the mysteries of human health and to offer “a deeper understanding [and] appreciation of the natural, healing resources of life and the patterns and paradoxes that can be experienced and potentiated for health, healing” and quality of life (Watson, 1995, 67-68).
Community

Community is the next concept that characterizes knowledge development in the health sciences in the next century. Those of us in the health sciences are cloistered in our specialized fields with little if any contact with each other. While we give lip service to interdisciplinary research, it is far from being lived out. Our different subspecialties grow, and we are confronted with keeping up with the knowledge in our own disciplines. It may seem a daunting task to engage with others, but in the next century we must and we will. We will not abandon our disciplinary knowledge and perspectives, but will each bring them to the table in addressing the common health problems of our time.

Our communities will include scientists and practitioners. For too long our worlds have been separate: the rich knowledge from practice has been lost in the flurry of the demands of practice; the rich research resources of science have been alienated from the places where they can make the most difference, in the lives of people. While basic science will continue to be needed, the priorities for our research will come from the priorities of our larger communities and the ecosystem. Science will be more responsive to its mission of social responsibility. Technology will assist us in forming these communities as we share research findings, discuss our concerns, and communicate instantaneously through video conferencing and the Internet. Communities should be places of cooperation, not competition, where we nurture and care for each other and celebrate our collective accomplishments.

Consciousness

Consciousness is the final concept that I shall discuss. Consciousness refers to expanding awareness in the scientific enterprise. A greater appreciation for multiple ways of knowing and methods of science will characterize this consciousness. Multiple paradigms for science will coexist, providing a collage of awareness on phenomena related to health. Knowledge from the humanities, ethics, arts, and philosophy will inform us as we integrate knowledge across disciplines. Each of us is invested in the search for truth; this search will lead to an integration of our work-mind with our heart or spiritual center. "It is critical that we work from epistemologies attuned to the deepest understanding of both the rational as well as irrational (and mysterious) dimensions of human experience" (Preston, 1992, p. 16).

The recognition that the consciousness of the researcher itself helps to create the phenomenon being studied has implications. Preston (1992, p. 14) suggests the use of "multiple models for describing paradoxical or seemingly contradictory phenomena." The study of health phenomena requires diverse, wide-angle lenses to capture their complexities. Praxis models of research acknowledge the consciousness of the researcher and the participants in the development of knowledge, and honor the assumption that we are all changed by the scientific process. In these methods, which have great promise for professional disciplines, the practitioner-researcher facilitates exploration of health patterns that lead to an awakening of choice and self-understanding or expanding consciousness (Newman, 1995). Creativity, imagination, and innovative thinking are needed more than ever as we invent new paths to understanding.
An Integrative Vision for the Twenty-First Century

In summary, this vision for knowledge development in the health care sciences in the next century encompasses: (1) integrating science, humanities, ethics, arts, and philosophy; (2) creating communities where consumers, practitioners, scientists, and philosophers gather to identify, explore, and discuss phenomena of common concern; and (3) diversifying approaches to inquiry that illuminate the complexities of human health and well-being. It may be time to bring out our wise bear's perspective on this vision.

In the story of "Piglet Entirely Surrounded by Water," we see how diverse approaches to the problem of Piglet's being stranded in a flood ended up in his rescue by Pooh. Although Pooh was unable to read the message for help sent in a floating honey pot, he sought consultation from others to solve the problem. He commissioned Owl's help to fly to Piglet to keep him company. Pooh used his honey pot as a boat in which to reach Christopher Robin, but realized it was too small to carry others. Although he was "a bear of very little brain," his creative thinking led to the idea of using Christopher Robin's umbrella as a boat. It is through "jiggeting" that Pooh solves the problem. Jiggeting suggests "the dance of ideas in the uncontrolled sleeping mind" (Williams, 1995, p. 79). Pooh illustrated how innovation and development of new methods led to solutions to the critical problems of health—Piglet's, that is.

In the story of Christopher Robin leading the expedition to the North Pole, we see the power of creating communities to gather and solve problems of concern. The entire community in the Hundred Acre Woods embarks on a journey of discovery. On the way, little Roo, Kanga's baby, falls into the river. Everyone joins in to save Roo from the raging river. Pooh grabs a long stick and throws it for Roo to grab. Christopher Robin in astonishment asks, "Pooh, where did you find that pole?" Pooh says, "I just found it. I thought it ought to be useful so I just picked it up." And Christopher Robin exclaims, "Pooh, the Expedition is over. You have found the North Pole!" This illustrates that the noblest of our scientific discoveries are born from a desire to care for others, and that despite our systematic methodological rigor, luck and pure serendipity are significant in scientific discovery (Williams, 1995, p. 35). Through this example we see the integration of values and science, research and practice.

We can approach the next century with an awareness of the possibilities presented in multiple approaches to inquiry that allow for a fuller, richer, more integrative understanding of phenomena related to health and healing. We see the forces within health care impacting the health sciences and realize the tensions resulting from these seemingly opposing forces. The way we approach these tensions will make all the difference in the world for all of us. We can see them as opportunities to join together in communities, to bring a creative consciousness to our work together, to celebrate diversity among us, and to honor the freedom, dignity, and uniqueness of those we serve. Like Pooh, we are all on that continuing search for honey!

References


