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Role of transparency in managing outcome successes

Causes and end use/least cost as decision guides

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Abstract

Purpose – Healthcare is both the largest (17 + percent) and the most rapidly growing (three plus times the consumer product index (measure of inflation) and half a percent of gross domestic product each year) segment of the US economy. The purpose of this paper is to focus on outcome successes that illustrate application of a previously reported health equation. The health equation allows an organized and more transparent assessment of healthcare outcomes.

Design/methodology/approach – The approach includes “end use/least cost” techniques that identifies healthful care as a big unmet need (BUN) and equally attractive business opportunity in identifying health promotion that improves outcome at lower net costs.

Findings – Opportunity exists to reduce costs while also reducing adverse events, healthcare morbidity and morality. Transparency is essential to find what works more effectively to yield desired outcomes. Metrics and measures, particularly more precise tools to assess true outcome in promoting health or managing ill health, are given priority as they allow quantified and, often econometric, outcome opportunities in the midst of current uncertainties.

Practical implications – This paper is for consumers and businesses, managers and administrators, professionals and allied health professionals. The successes described herein illustrate fundamental opportunities driving change and innovation within healthcare and in our society.

Originality/value – Attention is called to opportunity areas that can fund out of savings the transition from the authors’ current “sickness care” system to a healthful care, proactive prevention approach to delivering care. Novel application of transparency and end use/least cost can help guide choices to achieve healthier outcomes.

Keywords Health services, Medical care, United States of America, Management

Paper type Research paper



Role of transparency and opacity in outcome successes: examples and lessons

An equation of health, previously defined (Jaffe *et al.*, 2007), is updated with emphasis on outcomes successes and the role transparency or opacity play in the appreciation and dissemination of such opportunities. This health equation is premised on getting in enough of the “good” and out the toxic or metabolic “bad” (Schoen *et al.*, 2006). The health equation is based on the self-correcting capacity of human systems (homeostasis), the intimate and bidirectional relationships between mind and body (mindbody, psychoneuroimmunology), and evidence based health promotion practices.

Community-based public health incentives serve as an independent “reality check” on the perceived and demonstrable total benefits of the approach.

This process is an example of applied transparency enhancing better decision making by design, including appropriate technologies to facilitate better outcomes. In general, successful technology outcomes are those that are so user friendly that they facilitate (rather than intrude upon) the transaction or interaction at hand. An example is voice recognition software to record a health professional’s interaction with a client rather than a keyboard based information entry system that can be a barrier to effective communication and communion between the healthcare provider and the client.

We compare and contrast commonly available, conventional healthcare with consumer driven healthcare (CDH). CDH includes self-care, wellness, holistic, integrative, comprehensive, and whole-person healthcare. A transparent process is used to bring objective screening to available options. The American Society of Integrative Medical Practice (ASIMP) working group on health outcomes believes that our current assumptions about health habits, quality of life (QOL) and resources expended for health are facing a reality check of substantial proportion (Contact Jayashree Mani at 703.788.5109 or JMani@RMJHoldings.com for details on the ASIMP process).

Identifying and monitoring messages that impact individual and national health benefit from an equation of health that identifies each of the independent variables that enhances or takes away from good health. This paper puts that equation to an outcomes test. Interesting parallels with “end use/least cost” analysis as applied in energy and security policy suggests similar promise in healthcare. While challenging, comprehensive system modeling is promising yet limited (Serman, 2002) (Table I).

For managers in healthcare and executives responsible for healthy corporations, this paper provides examples of successful application of a health promotion “equation of health”. Managers often set the measures, the incentives, and the frame for evaluating outcomes. An independent, objective reference can be useful in making better decisions.

From employee healthcare plans to coverage policies, from community public health to media messages, examples of successful outcomes are presented as guides to better understanding and decisions.

This paper reviews examples that illustrate these opportunities and the challenges faced by the emerging, outcome effective yet currently uncommon care practices. Both the science and the business of health are included in the examples.

A challenge: information in biomedical science now doubles in less than the four years it takes to educate a health professional. Institutions are capable of change in decades. Some of what we thought we knew or assumed to be true is challenged by the empiric results in the examples included. Bringing new truth to our administrative centers of power is an increasingly complex and opaque process. Transparency is an antidote in that the illuminating value of transparency can often turn opportunity into compelling need and insights into collaborations (Jaffe *et al.*, 2006; Kohlsrud, 2006).

Conventional healthcare’s inertia is yet another challenge. Resistance to change and preference for the familiar, however functional or dysfunctional, are typical of large systems. To overcome inertia, clear and consistent, reinforced and rewarded messages

and/or incentives are needed at all functional or organizational levels (Gawande, 2007) (Figure 1).

The challenge of incentives: both CDH/integrative and conventional healthcare systems respond to the incentives given them (Jaffe *et al.*, 2006) Transparency allows for wiser choices with fewer unforeseen or adverse consequences due to improved clarity in the decision process (Leavitt *et al.*, 2006). Decisions can sometimes be made by smart systems. People can focus on the decisions that smart systems are not smart enough to make.

Different outcomes call for different incentives (Topol, 2004). The challenges of current opacities remain extensive (Steckler and McLeroy, 2008). We have fundamental challenges in agreeing on what measures and metric are reliable, particularly where whole system or lifetime outcomes are sought. Statements of the breadth and depth of the problem abound:

- Porter, R. (1997), *The Greatest Benefit to Mankind: A Medical History of Humanity*, WW Norton, New York, NY.
- Angell, M. (2004) *The Truth about the Drug Companies: How they Deceive us and What to Do about It*, Random House, New York, NY, available at: www.nybooks.com/articles/17244
- Coulter, H. (1994) *Divided Legacy: A History of the Schism in Medical Thought; Vol. IV, Twentieth-century Medicine, The Bacteriological Era*. North Atlantic Books, Berkeley, CA.
- Abrahamson, J. (2004), *Overdosed America: The Broken Promise of American Medicine (Hardcover)*, Amazon.
- Garrett, L. (2000) *Betrayal of Trust: The Collapse of Global Public Health*, Hyperion Press.
- Lappe, M. (1995) *Breakout: The Evolving Threat of Drug-resistant Disease*, Sierra Club Books.
- Berwick, D. (2004) *Crossing the Quality Chasm*, IOM, NAS Press, Washington, DC.
- Berkson, D L. (2000) *Hormone Deception*, Contemporary Press, Chicago, IL.
- Moynihan, R. and Cassels, A. (2005) *Selling Sickness: How the World's Biggest Pharmaceutical Companies are Turning Us All into Patients*, Nation Books, New York, NY.
- Brownlee, S. (2007) *Overtreated: Why Too Much Medicine is Making Us Sicker and Poorer*, Bloomsbury USA, Washington, DC, p. 352.
- Davis, D. (2008) *The Secret History of the War on Cancer*, Perseus Books, New York, NY, p. 512.

All these issues are particularly true for communities with health disparities. Calls for solutions are increasing (Musich *et al.*, 2000). The \$2,000bn expended in pursuit of health in 2005 favors conventional treatment over health promotion approximately 50:1 (confirmed by the Office of Health Information and Health Promotion, Department of Health and Human Services, and Elliot Fisher of the Dartmouth Atlas on Healthcare). Better health and improved QOL are goals more than priorities in

Conventional healthcare embraces the following fundamental values	Consumer driven healthcare (CDH)/integrative medicine embraces the following assumptions
<p>1. Disease care is the basis of medical practice. This includes describing healthcare in terms of the ill health present. While preventive medicine is valued, it is expressed in terms of disease avoidance or earlier disease detection. Further, resources are applied to treating diseases rather than promoting health. Proactive prevention is more a rhetorical goal than an integrated priority. Our too narrow application of prevention to mean early disease detection and treatment is too narrow; too “down stream”; too preoccupied with fighting disease rather than promoting good health and addressing the causes of ill health</p> <p>2. Symptom descriptors are sufficient to describe health status</p> <p>3. Research and treatment priorities are based on diagnosing and treating ill health</p> <p>4. Individual treatment successes are measured in terms of symptom disappearance. This leads to short term or dependent variables being taken as the measure of outcome benefits. A concomitant depersonalization occurs</p> <p>5. The absence of symptoms is taken as the measure of health</p> <p>6. Selective opacities are encouraged to enhance perception of short term or symptom suppressive results in contrast to using independent and intervening variables to assess health enhancement</p>	<p>1. Good health is the basis for medical practice. This includes describing healthcare in terms of health enhancement, QOL or well being present. Preventive medicine and health promotion are framed in terms of proactive and reinforced or incentivized actions. Further, resources are applied to promoting health during all phases of life and with reference to incentives for health promoting choices and habits</p> <p>2. Vitality and the causes or risks to good health are sufficient to describe health status</p> <p>3. Research and treatment priorities are based on diagnosing and treating, enhancing, or restoring good health</p> <p>4. Individual treatment successes are measured by comparison to the full expression of attainable well being. This leads to independent or intervening variables of functional health being assessed in terms of risk reduced or well-being attained. Individuals are compared to themselves in regard to their health expression</p> <p>5. Expression of wellness, QOL and high-level health measures are applied to assess functional outcomes</p> <p>6. Transparency is encouraged to enhance the documentation of health and well being attained</p>

Table I.
Compares and contrasts conventional healthcare with integrative health promotion

healthcare, based on the about 2 percent of resources allocated to true health promotion. Resources allocation in 2008 remains the same: \$2.5tn and 17.5 percent of gross domestic product are being devoted to conventional healthcare with less than 2 percent devoted to true health promotion (www.cms.hhs.gov/NationalHealthExpendData/downloads/proj2006.pdf).

Conventional healthcare’s reliance on symptom reactive care has emerged due mostly to short-term and interdependent variables. This means reliance on intervening and independent variables as sufficient to achieve better long-term outcomes. Such approaches are high in opacities and not found among successful examples.

An additional estimated \$250-500bn is expended for CDH and integrative care, mostly from discretionary, out-of-pocket resources (source: Health Studies Collegium, ASIMP, Lewin Group, Deloitte Center for Health Innovation).

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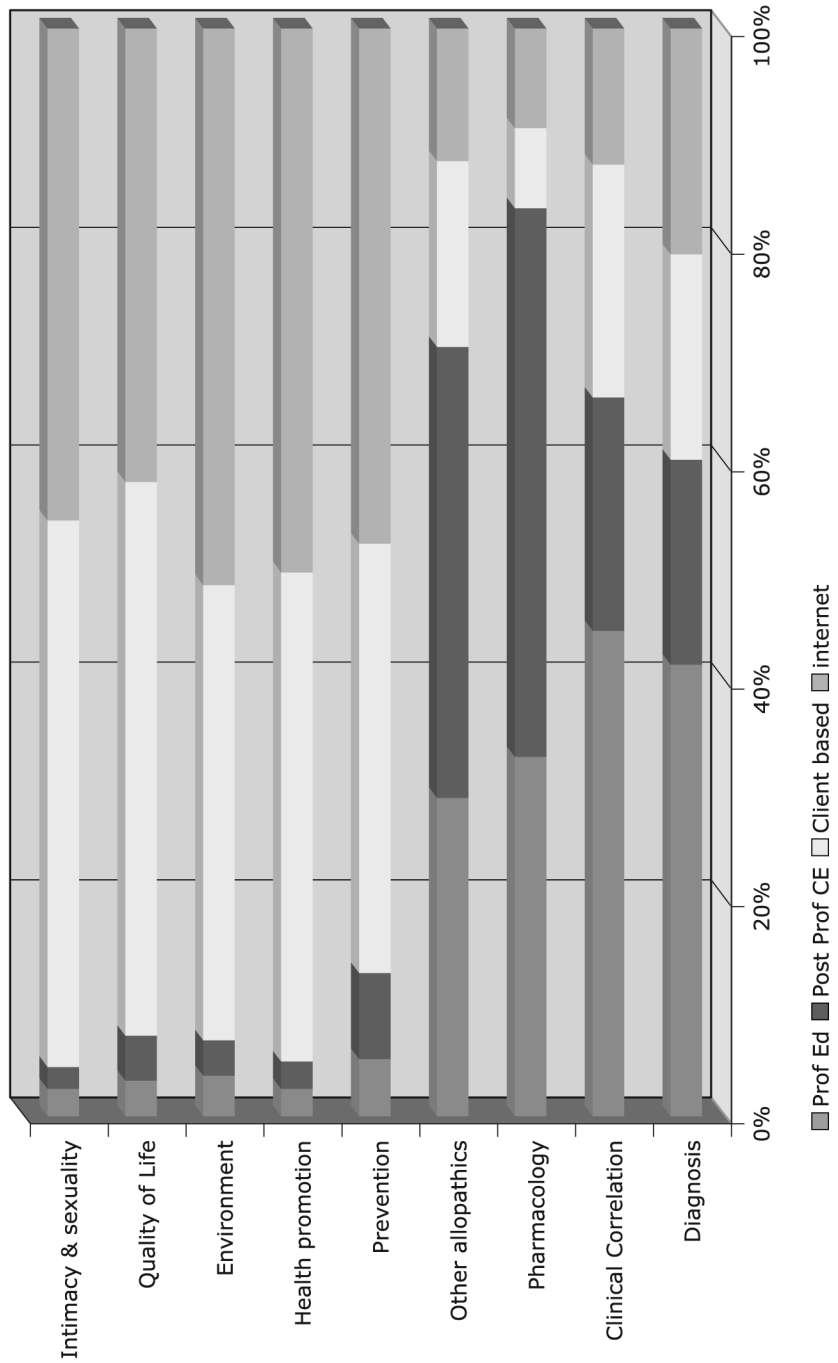


Figure 1.

As prudent people, consumers or businessmen, opportunities to leverage outcomes while reducing risks and costs, are desired yet hard to find systematically given conventional realities. Conventional measures are too often narrowly framed, independent of health promotion and quality outcomes.

This analysis makes no a priori distinction between mind and matter; both activities and attitudes are included in the equation's outcome tests.

Homeostasis, psychoneuroimmunology, health promotion practices, cross cultural medical anthropology and community public health outcome studies provide a fertile territory within which to find examples of successful outcomes ready for wider application. These can help speed the transition from sickness care to healthful care, funded out of savings from financial and emotional costs not incurred.

The following health equation defines the sum of choices (Σ), e.g. the sum of life enriching or life enhancing choices less life diminishing or life dissipating choices, i.e.:

$$\text{Health} = \sum \text{Life choices [Enriching and enhancing]} \\ - [\text{Diminishing and dissipating}]$$

The health equation translates as:

Health is the sum of and results from our choices in regard to :
nutritional, behavioral, and attitudinal competences minus genetic,
acquired toxic and distress burden.

For practical application, each of the three positive and three negative variables are assigned a score of 100 as maximum or fullest expression of that variable or value.

For example, a person who expresses optimum health is quantified as:

$$\text{Health} = \sum \text{Life choices [Enriching and giving]} - [\text{Diminishing and dissipating}]$$

$$\text{Health} = \sum [\text{Nutritional} + \text{Behavioral} + \text{Attitudinal health}]$$

$$\text{Less} [\text{Genetic} + \text{Xenotoxin exposure} + \text{Distress factors}]$$

$$\text{Health} = \sum [100 + 100 + 100 - (0 + 0 + 0)]$$

$$\text{Health} = 300$$

Successful examples of health enhancement factors: nutrition, behavior and attitude in the marketplace

The essential "background" or causal factors crucial to human health are diet and hydration choices, activities of daily living, environmental exposures and attitudes.

Many health enhancement dependent variables and interdependent variables have been identified in support of this model, most within the recent past.

Their implications, though consistent, are unconventional and may reflect the need for "sea changes" in the direction of aspects of healthcare.

Background assumptions operate, almost by definition, largely unseen, subtly yet profoundly influencing our health assumptions and implicit biases (opacities).

By identifying them and making their effects transparent in precise, quantitative terms, a guidance process for navigating through healthcare reform may thus become available.

This is analogous to the rationalizing of conventional services and reimbursements that emerged through the resource-based relative value scale process, the physician payment schedule for Medicare (2008 CMC RBRVS Reference Book, Health Decision, 2008).

Diet: trans fats in the diet

Hardening oils by hydrogenation made for convenience/snack foods with long “crisp” shelf life without rancidity because the fats that might go rancid were chemically modified through addition of hydrogen. Subsequently, it became clear that the same fats that are susceptible to rancidity are turned inside the body into essential communication molecules. Beyond that, trans fats of this kind are man made and do not occur in nature. Subsequently, it became clear that this had an adverse effect on cell membrane fluidity, a fundamental and essential aspect of cell health.

For 20 years after the above observations were confirmed, regulatory and industry processes delayed the removal of hydrogenated trans fats from our diet (Enig *et al.*, 1978). Today, food manufacturers are required to disclose to consumers that amount of trans fat in their product (Valenzuela and Morgado, 1999). This has led to the successful reformulation of many foods with healthier ingredients.

The good news is that enough has been learned from the trans fat example to anticipate how chemical modification of delicate food components, often present in small yet biologically important amounts, can have biological, environmental, or other physiologic effects.

We will reap the health and productivity benefits over the next decades. Estimates are the 2-20,000 lives and \$1-15bn can be saved each year through the use of healthier rather than convenience driven edible oils due to ill health and suffering avoided.

Biomimicry is an emerging field within biomedicine that specializes in developing emulations of nature’s fully recyclable (no waste) processes to fulfill identical functions (avoid rancidity; improve product consistency and taste) for which we now have primarily mechanical solutions (hydrogenation of edible oils) that generate substantial waste and tend to be energy intensive in contrast to the biological analogues (Benyus, 2002).

Diet: water and hydration

The better beverage of choice for humans is water rather than sugared, artificially sweetened, or caffeinated beverages. Too many people have inverted this nutrition basic, i.e. their beverage of choice is something other than water. In too many cases, their palate was taught in childhood to require the stimulation built into snack drinks. Water is a subtle beverage.

We need two quarts of water daily to wash out the toxins that move through our body without risking harm to our livers or kidneys. In dry climates, while traveling, and under stress we may need more to avoid marginal (in absolute terms) yet significant (in functional and clinical terms) dehydration.

An increasing issue in many urban areas is the decline of water quality from the urban water supply. This has led to a robust business in bottled water, albeit with questions about the quality of some bottled water.

The good news is that consumers are more aware of the importance of hydration and are taking action to drink more water, setting a better example for their children and loved ones. While we have a way to go, the progress is encouraging (Wang *et al.*, 1999). Hydration is a life-critical matter with being just 3 percent low significant and all too common (Batmanghelidj, 1997).

The importance of good hydration in health can be appreciated in that the most sensitive measure of renal function is 1st AM specific gravity (Jaffe, 1995, 2008). This means that the ability of the kidney to concentrate urine depends upon keeping toxins dilute through intake of adequate amounts of healthy water. Concentrating capacity at night depends upon adequate hydration to safely wash toxins through the kidneys during the day.

The issue of hydration was recognized by The International Life Sciences Institute (ILSI), which found that the role of hydration in the maintenance of health is critical. Studies in healthy adults show that even mild dehydration can impair a number of important aspects of cognitive function such as concentration, alertness, and short-term memory. We cannot live without water for more than about 100 hours, whereas other nutrients may be neglected for weeks or months. Inadequate hydration can cause a range of symptoms from tiredness, headaches and decreased alertness to even collapse and death. No other nutrient is more essential and required in as great amounts.

When cells are adequately hydrated, however, this triggers an anabolic mechanism in the body, which is accompanied by positive nitrogen balance, protein synthesis, and growth hormone release, even in older subjects. Improved cellular hydration also results in a reduction of cell acidity, reduced autoimmune response, increased fat burning, DNA repair, and increased resistance to viruses.

Current scientific theory shows that waters are not all created equal in their ability to increase hydration at the cellular level (Symposia on Hydration, Sodium Intake and Health, 2006, 4th Asian Congress of Dietetics, Manila, Philippines, April 24-26, 2006, ILSI SEA Region and ILSI North America).

The good news is that there is a useful test for hydration status. This is known as the "wrist skin pinch test", described elsewhere, that allows us to assess our own or other's hydration status whenever desired with a non-invasive, self test (www.detrick.army.mil/tenants/ih/ehhot.cfm). Good hydration is estimated to save a projected 10-50,000 lives annually at annual net savings of \$1-5 + billion.

Diet: mineral balance, diet choice, osteoporosis risk, osteopenia and reversible bone loss
There is growing awareness and medical emphasis on bone loss (osteoporosis; fracture risk). The minerals most associated with bone health are calcium and magnesium. Cell metabolism (net acid production) regulates mineral balance in the body of all but a few people with unusual kidney-metabolic, mostly genetic errors of metabolism. For the overwhelming majority of people, the net acid excess (NAE) in their diet determines how much buffering mineral like calcium and magnesium are needed to neutralize the metabolic acids produced by stress, toxins, nutrient deficits, or other environmental insult. Clearing these acids from the body through urine, stool, and sweat is necessary for us to survive.

In Europe, women consume half as much total calcium as their American counterparts yet have half as much osteopenia, osteoporosis, and fracture risk. European women consume much more whole, nutrient dense foods that are alkaline forming. They engage moderate exercise and get more time outdoors than do their American counterparts. These differences likely account for their favorable mineral balance and healthier bones (Frassetto *et al.*, 2007).

In America, the much higher NAE, without corresponding increase in mineral intake, predicts mineral depletion, initially from the bone periosteum, then the cells and interstitial space, and, finally the bone. They help us to appreciate why osteoporosis accumulates over decades yet not inexorably (MacLeay *et al.*, 2004b).

The good news is that the Alkaline Way describes a way of living that embraces the many opportunities the meet today's challenges with prudence and resilience (Jaffe and Brown, 2000).

In clinical outcome case reports, bone building is the rule rather than the exception, when an Alkaline Way to life is fully embraced. Collateral benefits include reduction in cardiovascular and cancer risk markers as well as improved QOL (MacLeay *et al.*, 2004a).

Estimates are that 5-10,000 lives and over half of fractures associated with falls among the elderly can be saved when we transition to an Alkaline Way, better bones for better bodies approach (MacLeay *et al.*, 2007).

Diet: good fats are essential

Omega 3 fats come only from a few sources including deep water oily fish, algae, certain seeds and a few leafy plants (Hooper *et al.*, 2006). "Coronary heart disease is a significant health problem that causes 500,000 deaths annually in the United States," said Dr Lester M. Crawford, Acting FDA Commissioner:

This new qualified health claim for omega-3 fatty acids should help consumers as they work to improve their health by identifying foods that contain these important compounds. Supportive but not conclusive research shows that consumption of environmental protection agency and DHA omega-3 fatty acids may reduce the risk of coronary heart disease (www.fda.gov/bbs/topics/news/2004/NEW01115.html).

The good news is that we can reduce average cardiovascular risk by 30 percent by taking in adequate amounts of mixed beneficial fats such as omega 3. Typical adult needs are 1-6 grams of such omega 3 fats daily with regulation of omega 6 fats the counterbalance the omega 3s (Lands *et al.*, 1992).

Given the half a millions deaths annually ascribed to cardiovascular diseases, the projects to 150,000 lives and a correlated \$15-30 billion dollars that can be saved annually when we shift America back to an omega 3 rich rather diet.

Diet: Imbalanced fat intake results in harm

Omega 6 increase in the diet of typical Americans correlates with cardiovascular and inflammatory/cancer increases (Harris, 2006).

The good news is that those who use this information can dial up or down their cardiovascular, inflammatory, and autoimmune chronic disease risk accordingly.

Diet: organic and biodynamic foods are healthier (really)

While too little rigorous work has been done, the accumulating evidence is that organic and biodynamic farming methods result in better nutritional quality (Nutrition and Biodynamics: Evidence for the Nutritional Superiority of Organic Crops Virginia Worthington MS, ScD, central nervous system (Originally in *Biodynamics* 224, July/August, 1999) www.biodynamics.com/biodynamicsarticles/worth.html). This is particularly so for components present in tiny physical amounts but with powerful biological activity (Storl, 1979). Useful overviews of this subject have been published since *The Meaning of Life*, the classic work written in 1923 by Rudolph Steiner built upon *The Metamorphosis of Plants* written in 1812 by Johannes Goethe.

After a fascination with size and appearance, more consumers are active in seeking better quality and health benefits from the foods they purchase. Consumer demand is reshaping the food industry in dramatic, and, in these regards, healthier way. Trends consistent with this include the growth of locally grown, vine ripened produce, heritage strains of fruits or vegetables, school gardens, and family gardens.

A separate issue not addressed here is the increasing share of the diet consumed outside the home or purchased immediately before consumption in some pre-prepared form.

The good news is that the Alkaline Way includes suggestions of how to buy the healthier of available resources and then prepare them in health sustaining ways. Lastly, the social experience of eating food, prepared to be shared with gratitude, enhances the benefits from wisely chosen ingredients.

Were all Americans to consumer the 13 servings of fruits and vegetables recommended by the USDA, 120-240,000 lives could be saved annually. The financial benefits are more difficult to quantify.

Activities: light, vitamin D3 and innate protection

It has been long assumed and recently confirmed scientifically that adequate sunlight is required for human health (Kime, 1980). Special needs for sunlight exist in the young, those who exercise vigorously, the elderly, and the infirm. Pioneering work in the 1970s confirmed the link between the dietary vitamin precursor and the wonder molecule, vitamin D3; 1,25 dihydroxycholecalciferol; a metabolite of cholesterol that requires sunlight on the skin to activate itself (Frolik and DeLuca, 1973).

Recent research has confirmed that needs for vitamin D3 is higher, much higher, than had previously been thought. Today, daily intake of 800-2,000 IU of vitamin D3 is commonly recommended by researchers and clinicians in the field with others recommending even higher doses. Paradoxically, life style changes have reduced time in the outdoors to less than the 20 minutes daily needs for these health promoting actions to occur (Holick, 1998).

Indeed, recent work suggests that cancer prophylaxis and improved treatment outcomes occur in those on adequate vitamin D3 intake. Paradoxically, a synthetic form of vitamin D (vitamin D2, ergosterol) had long been added to fortify the food supply. Unfortunately, vitamin D2 does not have the same benefits as the natural vitamin D3 (Reichrath *et al.*, 2003).

The good news is that the next decade holds much promise to save lives and healthcare costs by reducing multiple disease risks with vitamin D3. While

preliminary, estimates are that 20-60,000 cancer deaths can be avoided at savings of \$10-30 billion dollars annually.

Diet, environment, and attitude: community supported agriculture

At the community level, a movement is growing to support local farmers through seasonal subscriptions. This stabilizes the farmers income, provides locally grown, vine ripened produce on a regular basis during the growing season. A byproduct is community building, an opportunity to be outside in the sun, and greater awareness of the garden to table processes. A collateral issue, addressed elsewhere, is that most important such social movements go largely unnoticed by the conventional or established order until the change has largely occurred. Analogies may be found to our times (Hawken, 2007).

The slow food movement (Petrini, 2007), initially an outgrowth of the Mediterranean diet (Simopoulos, 1999) is another similar social trend and impulse operating in our communities.

The good news is that there is a synergy of benefits between providing local farmers with subscriber-based predictable income, preserving family farms, reducing chemicals in local water supplies or run off, and with increased awareness among community members of the opportunity to, as Hippocrates said in 377 BC, "let food be your medicine, and medicine be in your food."

Activities: touch is an essential human sense

Touch deficiency is now commonplace in industrial societies (Branaman, 2000). From infancy through childhood, when touch is lacking, emotional maturity is retarded, self esteem undermined, and self confidence lower (Marmor, 1994). "Healing touch raised my awareness and brought me a deep state of relaxation, which is not something you can get just by taking pain medicine," said Sarla Santos, RN, 40, who underwent lung surgery in October and receives healing touch therapy at New York University Medical Center.

The good news from IndoChinese, Hispanic, mid-Central Asian and tribal societies, where infant massage is part of traditional social practices, this inexpensive yet highly effective health builder is available. Parents interested in better learning and improved immune defense and repair systems for their children, with greater transparency, should consider one of these systems (Leboyer, 1997). In many traditions, there are specialists in pre- and post-partum care capable of transmitting touch-rich practices (Odent, 1985, 1986). A recently developed "therapeutic touch" system is in use in more than 30 hospitals by over 2,000 therapists, mostly nurses (Mehl and Peterson, 1984).

Activity and attitude: death with dignity and end of life choices

Death has been banished. We have largely delegated to professionals the care of our elders by institutional protocol. In life's last months and moments, too often, protocol rather than compassion determines what happens. In the futile attempt to delay death briefly, over half of most Medicare beneficiaries lifetime health expenditures occurs in the last few months of life.

Many prefer death with dignity, at home, with those we care about around us (Wanzer and Glenmullen, 2007). With adequate home care and hospice resources, much end of life care can be done at home at modest cost and with better QOL (Quill, 1990).

The good news is that, as a transition, death is part of life. Participating in the rites and traditions at that transition time, enables healing from the loss that death brings. Too often today, the immediate family is disconnected from those final moments with protocols and practice guidelines determining what will and will not be done (Hughes *et al.*, 1992).

Environment: bioelectrical currents

While bone health reflects our poor overall health, piezoelectric bone buildings and rebuilding is available yet too rarely applied. The slow application of this proven technology may be based on it being electromagnetic rather than chemical (Sobel *et al.*, 1996). The unfamiliar is accepted more slowly than the familiar, regardless of the objective data. For both people and horses, the opportunity for bone strengthening and enhanced fracture healing remain to be applied (Adey, 1975).

The good news is that we have the opportunity to build better bones and healthier bodies. We estimate that half of the 50,000 annual hip fractures can be avoided. Savings from full application of bone health include 20-40,000 lives a year at potential savings of \$5-10 billion dollars.

Activity: joint repair

Conventional wisdom is that joints wear out over time. We have become quite good at replacing joints with mechanical mimics. In the last several decades, it has become increasingly clear that providing the building blocks to the body encourages and usually allows for internal rebuilding of joint cartilage tissue with endogenous factors (Qiu *et al.*, 1998). This is an exciting example of recognizing that life is biological and self renewing when healthy rather than mechanical and inexorably declining (Jaffe R, results of clinical assessment of PERQUE Joint Guard, in preparation).

The good news is that combinations of soluble glucosamine, glucosamine sulfate, and chondroitin have been shown to reduce discomfort, improve mobility and rebuild joint cartilage connective tissue (Bassleer *et al.*, 1992). There may well be synergies when polyphenolic plant substances, such as soluble OPC (orthoproanthocyanidin; polyphenolic plant compounds from grape seeds or pine needles that are potent antioxidants and repair stimulators) are included. Other work suggests benefit from hyaluronates. Still other work shows benefit when ascorbate is present in sufficient amounts (Reginster *et al.*, 2001). For information on ascorbate and other repair factors for joint health such as soluble glucosamine, glucosamine sulfate, and chondroitin see www.perque.org. In all cases, bioavailability and functional activity of raw materials varies substantially, due largely to pour or porous regulation (Bruyere *et al.*, 2007).

Attitude: learned behavior

Our understanding of and interaction with the world is undergoing unprecedented change both in nature and in process. This is driven largely by technology and marketplace opportunity. Most of us have not signed an "informed consent" for this ongoing experiment (Kabat Zinn, 2005).

It is suggested that we have seen more change in the last decade than in the past millennia. The next decade promises to dwarf the extent and pace of change of the last. Social networks that are internet-based are an example. We are more connected yet more isolated than ever. We have more content available and we are more sedentary and impressionable than ever. Learned optimism is an option readily available yet too rarely chosen (Seligman, 1996).

Support for this view can be found in every spiritually based tradition. From Christian, to Jewish, to Hindu, to Moslem, Jain, Buddhist, Bahai, Subud, Anthroposophic, Theosophic, there are many examples of this perspective around the globe. See the following short list of references:

- Christian: *Anonymous Monk in 14th Century, The Cloud of Unknowing*, (1957). trans., Ira Progoff, Dell/Doubleday, New York, NY.
- Jewish: *The Pirkei Avos Treasury: Ethics of the Fathers; The Sages' Guide to Living With an Anthologized Commentary and Anecdotes*, (1999) Mesorah Press, New York, NY.
- Hindu: *Life of Tilopa and the Ganges Mahamudra*, (2002) trans. Thrangu Rinpoche, Khenchen, Zhyisil Chokyi Ghatsal Trust.
- Moslem: *The Divan of Qansuh al-Ghuri* (2002) by Mehmet Yalçin (Foreword by Annemarie Schimmel), Kansu Gavri Divani Trust, Istanbul.
- Jainist: *Janism* (1974) by Dakshin Bharat Jain Sabha and Colette Caillat, Macmillan Co., New York, NY.
- Buddhist: (www.san.beck.org/Dhammapada.html).
- Bahai: *Gleanings From the Writings of Bahá'u'lláh*, (1990) Bahá'u'lláh, US Bahá'í Publishing Trust, Wilmette, IL.
- Subud: *Sumohadiwidjojo M S.* (1990) Autobiography, Subud Publications International, Rickmansworth.
- Anthroposophic: *Anthroposophy and Science: Observation, Experiment, Mathematics*, 8 Lectures (1921) by Rudolf Steiner, Mercury Press, New York, NY.
- Theosophic: *Occult Chemistry* (1951) by Annie Besant and Charles Leadbeater, Theosophical Press, New York, NY.

The good news is that we have ample, tested examples to help us integrate and fully mature our values and purpose in living. Too few available themselves of such opportunities at great cost in emotional and physical suffering and lost productivity.

Attitude: active mediation and emotional intelligence

There are mindfulness and inner development techniques that are more suited to western rather than eastern societies (Leichtman, 1982). Other examples of the western tradition include:

- The power of positive thinking and constructive mental exercises: *The Mind Map Book: How to Use Radiant Thinking to Maximize Your Brain's Untapped Potential*, (1996) Buzan, T. and Buzan, B., Plume Press, New York, NY.
- Intercessory prayer: *Intercessory Prayer: How God Can Use Your Prayers to Move Heaven and Earth* (1997) by Dutch Sheets, Regal Press, Norwood, MA.

- Autogenic exercises: “Autogenic training for tension type headaches: a systematic review of controlled trials”, *Complementary Therapies in Medicine*, (2006) Kanji, N. and White, A., Ernst, E.
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The good news is that at this time when stress issues seem rampant and increasing, we can create an inner mental oasis of peace and equanimity. Perseverance furthers, as is oft repeated in the *I Ching* (Blofeld, 1976).

Environment: genetic health risk factors; single nucleotide polymorphisms and meaning
We are at the dawn of the genomic age. We are learning:

- We can test genomic fragments for possible risk potential (Bejjani, 2005).
- Cell messengers are more subtle and complex than we had imagined (Ribonucleic acid (RNA), iRNAs and aRNAs www.wi.mit.edu/research/faculty/jaenisch.html).
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- Biometric databases are being built even as we are learning what such biometric data is (Gutwirth, S. (2007) “Biometrics between opacity and transparency”, *Annali Dellistituto Superiore Di*, 43(1), pp. 61-5).
- Methylation: we understand our ability to detoxify environmental compounds through methylation (Deth, R., Muratore, C., Benzecry, J., Power-Charnitsky, V.A. and Waly, M. (2008) “How environmental and genetic factors combine to cause autism: a redox/methylation hypothesis”, *Neurotoxicology*, 29(1), pp. 190-201).
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The good news is that we are understanding life ever more deeply. The complexity and subtlety; the resilience and exquisite poise; the elegance and the austerity of life is challenging to fully appreciate.

Toxin health risk factors

From solvents to biocides, e.g. pesticides, fungicides, nematocides, viricides, and from hormone mimics to toxic minerals (including lead, mercury, arsenic, cadmium, and nickel) (Landrigan *et al.*, 2002), we are awash in toxins that serve as anti-nutrients (Wigle *et al.*, 2007). Anti-nutrients are much more abundant today than at any time in recorded history; typically, two to three orders of magnitude greater amounts than people were exposed to until the recent past. These toxicants are linked to accelerated cardiovascular, autoimmune, and neoplastic diseases.

The pioneering work of Schroeder and Pfeiffer in the 1960s, of Needleman in the 1970-1980s, and the confirmation by The Agency for Toxic Disease Registry, Center for Disease Control, Health and Human Services (ATSDR/CDC/HHS), revealed a big unmet need (BUN) to reduce the increasing exposure and enhance the safer biological removal of toxins from those exposed. It has been pointed out that essentially the whole planet is now exposed so that healthy, unexposed controls are harder and harder to find.

The interaction of these toxins has, even yet, been too little studied. We are naturally endowed with robust detoxification systems. Too often innate mechanisms become cumulatively overwhelmed (poisoned) or are not given the needed nutrients to perform adequately in the current environment. Too few increase their protective adaptive anti-toxic nutrient intake at great personal and financial costs.

Toxicant excesses in the twentieth century are, typically, 100-10,000 fold higher than humans (and the rest of biota) have experienced for millennia until the past two centuries, just six generations ago – barely a blink of history's eye. This issue is made more pressing by the progressive (logarithmic rather than linear) nature of this planetary intoxication.

The good news is that while we are working out the scientific details, a prudent person would increase their protective, anti-toxic nutrients to balance the increased xenotoxin and distress in industrial societies.

Environment: atmosphere and EMF

The world around us is constantly vibrating. Technically, this is known as the electromagnetic fields (EMF). Because of all the artificial fields in which we are bathed, some scientists refer to this as electromagnetic smog (Sobel and Davanipour, 1997; Stih, 2007). We have learned that some frequencies and quite safe whereas others can be quite selective in their harm.

Distress health risk factors: air quality, electromagnetic smog, atmospheric particulate and oxidant pollutants affect air quality. By distress burden we mean the health-suppressing physical and emotional reaction that occurs when the stresses of life exceed our capacity to cope and adapt. While stress is a challenge in life, chronic distress is the backdrop to much ill health and loss of life quality.

For too long, American society has rewarded a frenetic, workaholic, sedentary lifestyle that overvalues work and undervalues QOL (relaxation, exercise, family and social interaction and contribution to a larger purpose). Stress-related illnesses, "burn out", and accelerated chronic disease are common results. There is a balance point; a sweet spot for each of us where we are challenged but not overwhelmed; productive but not breathlessly on deadline.

Behavioral competence and personal productivity are enhanced, as a matter of fact, when America reprioritizes in favor of a healthful balance of work, rest, play and meaningful pursuits. Nationwide, visible information and motivation campaigns can help restore Americans to healthier habits. Since this is an opportunity for improved national health, productivity and wealth, it requires national leadership to articulate and act upon the opportunity. As has been well pointed out by economic experts across the spectrum of views, healthcare is not a level playing field within which market forces can operate efficiently. The Concord Coalition chaired by Pete Peterson and Robert Rubin, George Soros, and Alan Greenspan have reported on the importance of this issue.

Equal emphasis on teaching the importance of relaxation, enjoyment and renewal would yield great benefits. Schools can incorporate relaxation response training periods in the daily schedule and provide instruction in activities that encourage such lifelong habits.

These might include music, dance, art, photography, crafts, nature walks, gardening and reading for fun. Health education counseling and exercise programs should be made available in all places of employment. In both schools and corporations, time management skills can be taught as a way of helping people to achieve balance among work, play and rest activities. A media campaign can highlight and promote the link between these behaviors and health.

The good news is that we can be more intentional than ever in constructing a healthy environment for ourselves. By default, most people live, learn and work in environments that add rather than diminish their toxin exposures and burden.

Attitude: benefits of stress (eustress) rather than harm (distress)

When stress exceeds individual resilience it becomes distress that then impairs both mental and physical function through:

- biochemical responses that raise or lower blood pressure, suppress or enhance immune defense/repair functions, induce retention or release of fat and push the body toward or away from an acid-induced quick but unsustainable energy “rush”;
- hormones that stabilize or energize cells under attack at the price of reduced or renewed immune competences;
- control hormones that include progesterones, cortisols and counterbalancing dehydroepiandrosterone, (the parent molecule of repair and regulating estrogens and testosterone) derived from cholesterol, a molecule made in our liver as well as part of our diet; and
- visceral yet learned reactions (the “flight or fight” response) compared with the option of being at peace inside regardless of what goes on outside. This “third choice” is a learned option enhanced by guidance from the experienced coupled with individual practice is fortitude.

From active relaxation response training to functional biofeedback, from prayer to active meditation, from cultivating inner peace to finding our inner guide there are many techniques for experiencing alternatives to the “fight or flight” duality that too many learn as their only options. We actually have the choices of flight, fight or fortitude (Jaffe, 2008).

When repeated often in daily living, distress leads to impaired immune defense and repair functions, blood pressure and cardiovascular systems and a risk of chronic, autoimmune disease.

From particulates in the environment (Lippmann, 2007), to our growing use of elective, adaptive stimulants (Finnegan, 2003), from medication polypharmacy (Fulton and Allen, 2005), to emotional dwarfism (Stratakis and Chrousos, 1995), we are seeing many signs that we are pressing our species adaptive capacities beyond their resilience competencies.

The good news is that in addition to the above examples of success that can be widely replicated, the following is an update of a previously reported example of an individual who uses the equation of health over time.

These 18 examples of success, appropriately integrated into societies as culturally appropriate, can show us a path to sustainable, affordable, manageable well being. An end-use, least cost approach shows promise of surfacing more BUNs over the next decade. Transparency and independent outcome markers of quality or results are important synergists in this process.

Application of the equation of health: follow up on previous individual examples

We update our personal comparison today's conventional disease-reactive approach to an integrative medicine, CDH approach for Bill, C., a typical person. He complained of frequent, intermittent fatigue and constant sinus problems, with resulting coughing, hoarseness and dry, itchy skin. He suffers from frequent mood changes and seems to catch "any flu that goes around".

Finding nothing diagnosable, his conventional doctor prescribed antihistamines for the allergic symptoms, cortisone creams for the dry, itchy skin and over-the-counter cold remedies as needed to suppress Bill's symptoms.

The health-focused physician questions the patient in depth about his diet, exercise habits, work habits, stress level and both his and his family's long-term health histories. While this is part of a general medical history, the use of the information shifts from "chart based" to "action based". Appropriate functional and behavioral tests are requested.

Based on the findings, the CDH/integrative physician recommends the following functional tests:

- C reactive protein, a marker of inflammation and repair deficit, to measure inflammation, i.e. cumulative repair deficit.
- Homocysteine to measure methylation and detoxification competence.
- Oxidized fats to measure harmful free radical oxidation that also assesses antioxidant sufficiency. Antioxidants are nature's free radical traps; antioxidants protect from damage and stimulate repair.
- Phagocytic index to assess innate immune system ability to consume foreign invader infections before they are able to find a hospitable place to multiply within the person.
- Cellular metabolic acidosis via NAE measurement in first morning urine after six or more hours of rest.

- Transit time to assess how long it takes from consumption to elimination as an inexpensive assessment of digestive status.
- Temperature of skin on rising . . . both finger and core (mouth, underarm, or anal) temperature to assess thyroid function and stress adaptation.
- Blood pressure, height, and weight to assess Bill's health compared to his body fat composition and overall fitness.

Initial recommendations to promote health include:

- an Alkaline Way™ largely whole foods, alkaline, health promoting diet with as much essential nutrient density and little contamination as possible;
- targeted supplementation to counter observed nutrient deficits based on the symptoms described;
- a regular exercise program that integrates smoothly into the patient's lifestyle;
- functional laboratory tests as above;
- substitution for any items found to be immune burdens or immunotoxins; and
- distress reduction techniques, including tools for better adaptation to daily stressors.

The need for restorative sleep and regular time for relaxation, laughter, joy and sharing with significant others is part of our personal health plan. Healthy systems include specific measures to assess implementation the above recommendations, entered into the personal electronic medical record (including automatic reminder calendars) and health professional's chart to confirm their importance and integration into the health process.

Comparing outcomes in conventional healthcare and CDH/integrative care

The likely result of the first, disease-reactive approach is that the patient will experience some relief from the sinus problems via the antihistamines, some temporary resolution of the dry, itchy skin via the cortisone creams and some relief from cold effects via the over-the-counter medications. However, he will continue to suffer recurrent bouts of all of these problems and will need the symptom-suppressing medications on a regular basis.

His energy remained low and the risk of chronic, progressive, degenerative autoimmune illness will remain high. He is likely to remain chronically at risk and less than well, yet, for an extended time, may not be formally diagnosed.

Treating symptoms rather than the causes of his ill health leaves his health equation in further health deficit. This correlates with needs for more and multiple treatments at progressively higher cost and risk. The lack of precision in conventional healthcare prevents detailed application of this equation.

Applying this equation to Bill's situation, we find that his health equation on presentation was:

$$\text{Health} = \sum [\text{Nutritional} + \text{Behavioral} + \text{Attitudinal health}]$$

$$\text{Less} [\text{Genetic} + \text{Xenotoxin exposure} + \text{Distress factors}]$$

$$\text{Bill's initial values} = \sum [65 + 45 + 40] - [10 + 60 + 65] = 150 - 135 = 15$$

After following the recommendations based on his health appraisal questionnaire, his initial assessment and functional lab tests, Bill is found to have improved his health score as follows:

$$\text{Bill's six month follow - up} = \sum [80 + 65 + 70] - [10 + 20 + 25] = 210 - 55 = 155$$

This net improvement of 140 in his health score correlates with his subjective sense of improved well being, restorative sleep, higher nutrient content and enhanced detoxification ability coupled along with healthier understandings, actions to reduce or mitigate stress, and resilience. In addition, improvement in lean muscle and reduction in excess weight are observed without caloric restriction. Concurrently, Bill's blood pressure reduces to healthier levels:

$$\text{Bill's health goal} = \sum [85 + 90 + 90] - [10 + 10 + 5] = 265 - 25 = 240$$

The over ten fold improvement from his initial to his follow-up assessment reflects the benefit of wiser choices, encouraged and managed for long-term outcomes rather than short-term "feeling better" through symptom suppression that too often shifts the underlying issues without addressing their causes:

$$\text{Bill's one year follow - up} = \sum [30 + 55 + 50] - [15 + 40 + 35] = 135 - 90 = 45$$

He reports that "because of feeling better, I become less careful about my personal health program." He decided to recommit himself to his Alkaline Way Health for Life program:

$$\text{Bill's two year follow - up} = \sum [75 + 65 + 70] - [15 + 20 + 15] = 210 - 50 = 160$$

He reports that "having felt better and then found it slipping away motivated me to get with the program." With substantial improvement from one to two years follow up, he has comparable potential progress yet to realize. The more positive the sum of this equation for health (the higher the enhancement factors and the lower the risk factors), the more we are in the healthy zone and resistant to illness. On the other hand, when our sum falls into the negative zone we become more expressive of ill health (Table II).

The role of transparency in healthcare outcome success examples

Qualities and characteristics of healthcare transparency include:

- Clear understanding of assumptions.
- Clear guidance to professionals in the science of evaluating research studies and of scientific presentations that comprehensive health promotion is needed to achieve success.
- Comfort in saying "I don't know" or "Not within my area of expertise" by the professional. This can lead to fresh analysis and emergence of previously unappreciated opportunities.

Condition	CDH/integrative care USE provocative, functional tests and treatment protocols	Conventional reactive care USE physical chemistry tests to infer statistical probabilities
1. Prenatal care Neural tube birth defects autism Neurodevelopment	Intensive correction of nutrient deficits such as folate, B12, magnesium, and zinc as early as possible; active counseling on activity and healthy eating	Prenatal care usually begins after 8-10 weeks' gestation, with inadequate nutritional and attitudinal counseling
2. Childhood health Otitis media HeadStart	Identify/avoid immunotoxins; teach substitution or avoidance; correct nutritional deficits Teach self-esteem <i>a la</i> "Mr Rogers' Neighborhood" and Waldorf School models; involve volunteer foster grandparents	Treat infections with antibiotics and implant middle-ear tubes when this fails Concentrates on academic preparation
3. Adolescent health	Active health-habits counseling in school and via health professional contacts; reduce trauma and suicide risk	Annual physical examinations with blood pressure and cholesterol checks are the only current routine
4. Nutrition enhancement for in hospital patients with long ALOS not included elsewhere in this table	Screen all patients for malnutrition and intensively correct deficits through specialized nutrition teams; avoid catabolic illness, particularly in elderly and surgical patients; train social workers to look for behavioral problems and refer as needed Both: correct metabolic acidosis with alkaline diet; correct EFA, EAA, magnesium, and zinc or other identified deficits; identify and avoid immunotoxins and environmental toxins. Most hypertension, coronary artery/cardiovascular disease is reversible	Emphasis on symptom suppression or surgical intervention; most nutritional, social, and behavioral deficits overlooked
5. Heart disease Hypertension Coronary artery disease	Enhance individual immune defenses and natural killer-cell activity with biological response modifiers; reduce environmental toxins/immuno toxins; recognize that some tumor overgrowth is metabolically triggered and reversible	Both: primary therapy symptom suppression and surgical intervention when this fails
6. Cancer		Chemotherapy, radiation, and surgery to kill or remove the tumor with minimum damage to patient

(continued)

Table II.
Comparison of consumer driven and conventional therapies for nine health categories

Table II.

Condition	CDH/integrative care USE provocative, functional tests and treatment protocols	Conventional reactive care USE physical chemistry tests to infer statistical probabilities
7. Autoimmune diseases Arthritis Adult diabetes	Both: reset immune defense and repair competence by correcting nutritional, behavioral, and outlook dysfunctions; evoke the human healing response by training and reinforcing healthier habits; emphasize activity/rest alternation Identify causes of inflammation: antioxidant deficits; EFA/EAA needs; stimulate repair and regrowth of tissue (gingiva, vessels, cartilage, bone); active hygienist program to teach brushing and flossing Biological, nutritional, cognitive behavior therapy, therapeutic biofeedback, autogenics and psychotropics	Both: anti-inflammatory medications, steroids, and immunosuppressive drugs; minimal lifestyle and outlook intervention
8. Gingival/dental health		Annual examinations and cleaning; recommendation to brush and floss; surgery and restorative crown and bridge work as needed
9. Mental health		Psychotropic medication and traditional psychotherapy

Notes: EFA – essential fatty acids, required from the diet to maintain health; EAA – essential and conditionally essential amino acids, required from the diet to maintain health

- Intellectual curiosity and capacity to evaluate new therapies for both safety and efficacy using full lifecycle or lifetime measures and markers.
- Full disclosure by health practitioners of all safe and likely effective therapies for their situation or condition.
- Easy access of healthcare consumers to accurate and relevant information in a timely manner.
- Enabled and prompt diffusion of locally effective strategies or tactics throughout the healthcare system.
- Prompt and reinforced community education about therapies found effective or ineffective.
- Metrics that are functional and that correlate well with real world experience.
- A community value or priority to compassionate, candid, straightforward communication.
- Congruence between "best outcomes option" and "most often applied option."
- An active interest in innovative advances regardless of their origin.
- Allows for defined variables that can be used to build computer simulation models that accurately emulate particular "real world" condition sets.
- Transparency allows the relationship between resources and health impact to be observed more clearly.
- Transparency allows comparison between stated goal and actual quality of care provided in quantitative terms.

Discussion and conclusions

There is a cause and effect link between disease risk and the quality of our diet, activity, environment, and attitudes. When conventional healthcare diagnoses or treats disease, these four critical elements of health are generally outside the frame of clinical care. This is largely due to a focus on eliminating the immediate symptom rather than addressing the underlying causes of the condition.

While some health professionals specialize in health promotion and integrative care, estimates are that 2-5 percent of the 700,000 practicing American physicians include health promotion as a primary focus of their practice.

Further, in professional education, less than 1 percent of curricular time is devoted to the four pillars of health. This leaves many health professional uneducated about topics of keen interest to their clients. Some health professionals seek out additional postgraduate education in health promotion. Most health professionals have neither incentive nor personal motivation to do so in the current models of managing care.

Americans deserve incentives to promote their health. Too rarely are health promotion incentives available, largely because of market forces that currently favor a less than integrated approach through a combination of inertia and beneficial opacities. Media messages reinforced in the community and through health professionals can make being well a desirable goal. Local community resources could bridge the gaps for people interested in taking action on their health. While modest in cost and high in net benefit, diminishing resources available to public health reflects our preoccupation with treating the signs na symptoms of ill health.

In regard to activity patterns: American Children average just 0.5 hours (30 minutes) a week of “play time” outdoors. By comparison, their weekly electronic media exposure has increased to almost 45 hours (2,700 minutes) a week. The number of outdoor/environmental education programs offered in public schools has been decreasing in the last decade. A minimum of 0.5 hours (30 minutes) a day; 3.5 hours/week are needed for healthy physical and neurohormonal development. Too many of our children are overfed yet undernourished, sedentary and touch deprived. Coincident with these changes, diabetes in Californian children under five is increasing 5 percent per year.

In terms of media as a tool to deliver and reinforce messages, the typical American child can recognize 1,000 corporate logos yet cannot identify ten plants or animals native to his or her own region. Media can be a force to promote good health habits. Today, the media is largely a resource to reinforce ill health choices through restructured and empty calorie foods as well as reinforcing a passive approach to both activity and values, too often influenced by marketplace forces rather than proactive health promotion habits and values.

In regard to consumption choices: of the 12 + daily servings of fruits and vegetables we need for health maintenance, the typical American is getting 2-3 servings (17-25 percent of this need).

Typical Americans consume half as much water as they need for health. We have substituted other beverages for water. Wise choices would reduce substantially the intake of sugared, calorie free, and caffeinated beverages with water, green tea (unsweetened), and fruit spritzers in their place. While we can function at 3 percent dehydrated, our performance suffers.

An alternative is to increase water intake along with these beverages that burden our liver, brain and/or kidney in the process of detoxifying or metabolizing the beverages whose intake taxes rather than supports our hydration. This is why, for example, an espresso beverage is routinely served along with a glass of water in the Mediterranean and Moslem world.

In regard to learned attitudes: most attitudes and habits of living have been learned. Emotional maturity can be learned and practiced. In fundamental ways, self-image is initially learned in our family. Assistance can be offered to family, schools and community organizations so that children can be raised with higher sense of self-worth, enhanced self-esteem and values that strengthen social contracts between the governed and their representatives.

While the potential is substantial, implementation of health habits and attitudes that promote good health are rarely allocated community public health resources. In addition, public health is increasingly defined in terms of disease detection and treatment. An expansion to include proactive prevention is timely and opportune if we are to achieve the goal of full health within each individual’s capacities.

Beginning in elementary school and continuing through graduate and health professional studies, people can be taught the steps to self-esteem as well as how to enhance it in those around them. From parents and teachers, grandparents and surrogate parents alike, children need attentiveness, patience, positive reinforcement, gratitude, inclusion, praise and rewards for their efforts. School administrations, teachers and PTAs can converge to make these reinforcing behaviors a priority for students at every level.

Corporations can create climates supportive of self-esteem, including appropriate “360 degree” human resources practices. Significant learning and work productivity increases are observed in the few cases that have been thus far documented.

Businesses can institute ergonomically healthier work sites. This includes choices that enhance quiet in the work environment, appropriate density of people and machines, lighting quality, fresh air ventilation and minimum exposure to toxins, as well as flexible time, telecommuting and other approaches as appropriate to improve workplace productivity.

Both public and private sector employers can bring vacation allowances up to world standards with net benefits to the enterprise. The usual two to four weeks, depending on length of employment, now offered in America is substantially less than that given in all other industrialized countries. Further, skills for handling stress and negative emotions can be taught, beginning in elementary schools and continuing through life. This includes an appropriate mix of physical and mental exercises. Health counselors in schools and corporations can provide additional support via individual or group interactions.

Optimism, as discussed above, can be learned. Health emerges from our habits of living. Healthier habits can be learned within a few months of consistent practice. Lifetime better health is a dividend.

Both in schools and corporations, resources for stress and conflict reduction can be provided, ranging from work breaks to recesses to discussion and support groups. In addition, skills to minimize effects of stress can be learned. From home to schools to workplaces, leadership can be exerted to promote healthy choices in regard to workload, pace and attitude. Education can also teach those in both the public and private sector that “more [intensity] is not always better.”

Quality and productivity of work can replace quantity of hours spent as the basis for reward. Medical care facilities, both public and private, can be environments that reduce stress for those in need of healing – rather than increasing it, as is typical today.

From acute care settings to long-term health at home, school, and workplace we can choose more wisely and reap substantial rewards from our built environments and their finishing details. Resources are available from Rocky Mountain Institute, Snowmass, Colorado 81615, 1.970.927.3129. In addition, the American Institute of Architecture healthier building guide, available on their web site at www.greenbuilding.com provides additional information on healthier built environments and their management.

Senior citizen centers and nursing homes can expand elder care programs such as foster grandparents, elder co-care, arts and pet therapy programs and senior volunteers to provide loving, caring interaction between the elderly and the young – who are so often emotionally abandoned and, quite literally, untouched.

Increasing evidence suggests that integration of these “novel” yet relevant perspectives can meaningfully advance the quality of our personal and national health. Better information and understanding, measures and metrics, transparency and experience can contribute to better health outcome choices.

The need and opportunity are substantial in both lives and treasure. This health equation accounts for most of 100,000-400,000 premature deaths each year that cost from \$200 to 800 billion annually (10-40 percent of our healthcare expenditures).

Results are better when causes are distinguished from consequences. Further, results are more substantial when independent outcome measures (functional markers)

are used to assess the efficacy of a therapy or remedy. The widespread current use of interim markers contributes to existing opacity.

Finally, healthful care is much more than sickness care. Beyond the absence of illness, healthful vitality is part of the full spectrum of health. This is a core value of integrative medicine. The equation of health invites application of end use, least cost approaches. This can provide a basis for better decision making at the policy and practice levels.

Healthful care is an opportunity to apply wise business principles and practices, in compassionate and transparent ways, to healthful care as priority. This proactive prevention approach commends itself to prudent managers, consumers, business leaders and healthcare professionals. Integrative care shows great promise as able to systematically lead us from the current sickness care system to a being well for life system, funded out of savings from costs and suffering not incurred.

Looking transparently at causes of health issues opens opportunity for proactive prevention. Approaches that show highest return on investment are usually those that enhance QOL. This early application of “end use/least cost” approach finds favorable solutions that promote well being at modest cost and risk. Priority values include birth with reverence, meaningful work through a full life, and death with dignity.

We can gain some insight into priorities based on an assessment of how resources are allocated in professional training, postgraduate continuing education, client needs, and internet searches. The disconnection between professional training and consumer perception of need is substantial (Table III).

On its face, this table shows primary and continuing disconnections between consumer self-reported clinical needs and in web based information searches (3rd and 4th columns) in contrast to professional education (1st column) and post graduate continuing education (2nd column). In the business world, this translates into BUNs. Successful enterprises and industries are launched when BUNs are met.

Encouraging trends (from primary data not shown) include more attention than in previous decades to prevention, health promotion, environment, QOL, and intimacy and sexuality. This means from barely acknowledged to include for moments during professional education or continuing education activities. Specific specialty or affinity groups have formed to address aspects of these issues.

The origin of these disconnections goes back to the Flexner Report that set the strategic direction for scientific, reductionist professional education for the past

Category	Prof. training	Post graduate	Client needs	Internet searches
		continuing education Mean (percent)		
Diagnosis (Dx)	22	10	10	11
Clinical correlation (CPC)	25	12	12	7
Pharmacology (Rx)	36	55	8	10
Other allopathics (Sx&Rad)	12	17	7	5
Prevention (Prev)	2	3	15	18
Health promotion (Proactive)	1	1	18	20
Environment (Env)	<1	<1	9	11
Quality of life (QOL)	<1	<1	11	9
Intimacy and sexuality (I&sex)	<1	<1	10	9

Table III.

century. The message was reinforced half a century ago when biomedical science was seen as a counter weight to military-industrial influence on the economy. The concept was more plowshares and less spears. The flowering of reductionist biomedical science that followed was a by-product of this strategic view.

With the addition of direct to consumer advertising of pharmaceuticals and the rise of lobbying influence at all levels of policy and regulation, the collateral consequence has been finding elegant solutions to “manageable” scientific questions without a look at the community being served and what are their perceived and articulated needs. It is ironic that in the information age, the lack of a coherent, sustainable, strategic view of healthful care for all people is largely inhibited by the lack of objective, transparent bases for decision making and policy development.

Substantial near term opportunities exist for high yield outcomes to be favorable in lives and treasure; in building quality of community life and personal well-being. Risk reduction is a collateral benefit that can be documented particularly for diabetes, obesity and their consequences. There is a clear unmet need for proactive prevention and useful self-care. While the conventional medical model can evolve to include these or the BUNs can be met by marketplace and consumer forces that are driven by effective solutions. In either event, transparency and productive use of technology are handmaidens to more effective and efficient public policy and regulation.

Sources: AMSA, AAMC, AMA, ANA, AOA, ASIMP, AANP, ABMS, CRN, IOM, CMS, CHA, Google Foundation, through personal communications and polls taken at professional education and consumer health meetings attended by one of us (RMJ).

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