



Health E·D·D
EDUCATION • DATA • DIAGNOSTICS

VISION

The model for healthcare is personal responsibility using behavioral health as the first option.

MISSION

Help Lifestyle Medicine providers motivate people to make healthy lifestyle choices with

- a validated interactive Healthy Behaviors Knowledge Base mapping lifestyle habits to health consequences to identify needed behavior change and
- engaging, easy-to-use, animated multimedia coaching tools to support change.

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PROBLEM WITH HEALTHCARE

KEY FACTS: poor lifestyle choices are the ultimate cause of 75-80% of both US deaths and healthcare costs¹ and by 2020 two-thirds of all disease worldwide will be due to lifestyle choices.² And while 79% of online users utilize the Internet to research healthcare information³, the health information system is conflicting, confusing and—often produced by vested interests—occasionally fraudulent.⁴

Given these numbers, most of our healthcare dollars should be put into prevention and health promotion, yet less than 3% of all healthcare spending goes toward prevention efforts⁵ and far less towards lifestyle research. While we have the multi-billion dollar Human Genome and Human Brain projects, there *is scant scientific research on lifestyle behaviors* that have the biggest impact on how genes are expressed and how the brain functions to affect the organism's health. In addition to meagre lifestyle research, the US medical system, ranked #37 to #77 in the world for quality of care,⁶ contributes to the health care crisis by misapplying the acute medical model⁷ and by iatrogenic illness and errors.⁸

GENERAL SOLUTION

The key to affordable healthcare is getting people healthy so they are less dependent on the medical system, dramatically demonstrated in a study⁹ of 23,000 Germans reporting that the cumulative protective effect of just four healthy lifestyle factors lowers the risk of the most common and deadly chronic diseases by 80%. Mounting evidence that health problems can be significantly reduced through life-choice strategies suggests a *market opportunity for widespread education as a driver* for change.

HealthE•D•D SOLUTION

We propose a project using *knowledge engineering, behavioral strategies, entertainment and social media* to tilt the playing field toward a focus on lifestyle interventions and away from the “acute disease” model being misapplied to chronic lifestyle illnesses—80% of our costs. *Our solution is a first-of-its-kind Health Behaviors Knowledge Base and from that foundation create engaging delivery systems for different markets.* For health professionals, the interface will be professionally geared toward data mining, diagnosis, and basic facts since few are given training in lifestyle options. For consumers, simple multi-media materials will provide engaging lifestyle behavior information and innovative behavior modification techniques enmeshed within social networks. The most innovative elements to our “Life-As-Medicine” approach are captured in the EDD of our name:

EDUCATION

Engaging, multimedia, multiplatform delivery system with videos, animations and humor tied in with social media to capture attention, retain users, enhance learning and motivate behavioral change.

Physio-Flowcharts©, our most proprietary intellectual property, highlight the tipping point in the physiological cascade and reveal the #1 thing to do to improve health in each lifestyle category.

Habits for Habit Change© along with other change techniques (e.g. coaching), harnesses specific easy-to-approach lifestyle habits to initiate and sustain change in more entrenched behaviors.

DATA

Healthy Behaviors Knowledge Base© employs state-of-the-art knowledge engineering to map the biological pathways, mechanisms and probabilities of key lifestyle actions on health consequences.

Health “Wiki” leverages the power of crowd sourcing to engage users and keep information in the knowledge base continuously updated and monitored to preserve information integrity.

DIAGNOSTICS

The Self-Evaluator serves as a query system for the Healthy Behaviors Knowledge Base allowing physicians or consumers to enter symptoms to identify most helpful behaviors to improve health.

Biomarkers Testing via home, clinic or kiosk to assess effects of behavior on health: integrated into personalized knowledge base for more accurate prediction and prevention strategies.

Why we need a Healthy Behaviors Knowledge Base

Lifestyle behaviors are critical to health because they can affect organ systems, transmit infectious diseases, or elevate other risk factors and alter gene expression.

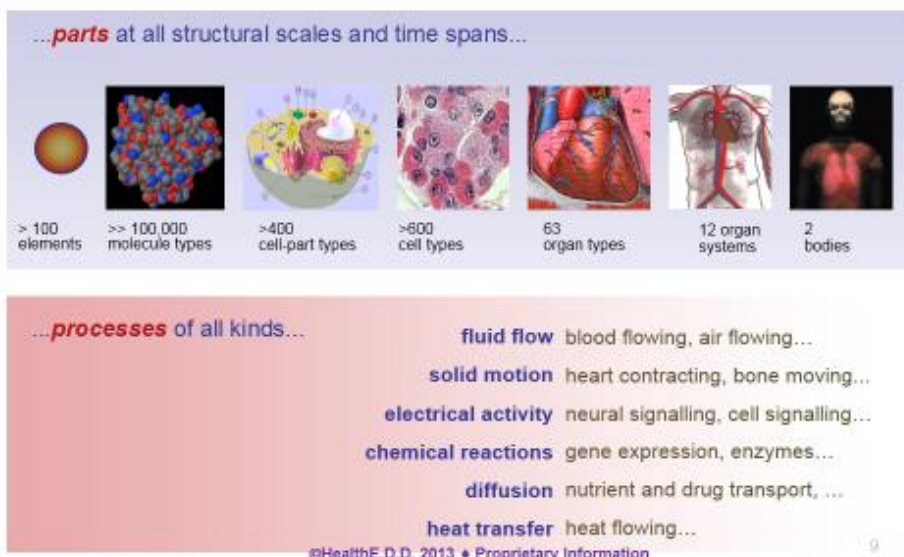
We will use knowledge engineering, semantic web technology and software developed by Dr. Dan Cook to map the biochemical pathways, mechanisms and probabilities of the health consequences of key lifestyle behaviors, and then create a query system—an evaluator tool allowing users to enter symptoms to identify which lifestyle behaviors are most likely to improve wellbeing.

This requires the spirit of Discovery Science and knowledge representation approaches that are both scalable and generalizable to accommodate the scope of project goals and the great span of phenomena relevant to human health. The various biological networks are incredibly complex and research is conducted in different discipline “silos” with:

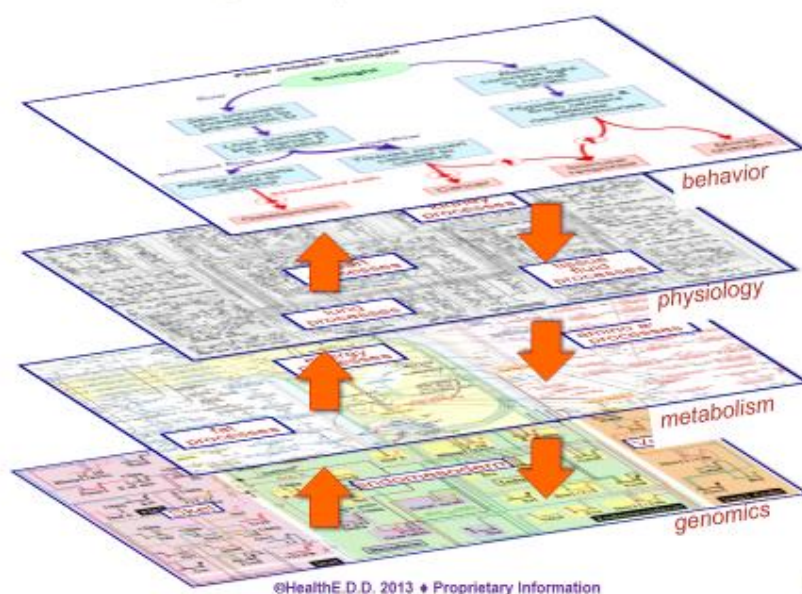
- *Incompatible* jargons and terminologies
- *Incompatible* data formats
- *Incompatible* computational languages

Our technology addresses all these incompatibilities for cross discipline integration and multiscaling. By adding behavioral maps and multiscaling to genomic and proteomic testing being developed in P4 medicine, we can create *personalized* knowledge bases to enhance *prediction* and identify the most likely behavioral and other wellness strategies to enhance *prevention recommendations* and consumer *participation*.

The *wellness* of an *organism* depends on how its *parts* and *processes* respond to its *environment*.



An immensely complex network of networks



About The Healthy Behaviors Knowledge Base (HBKB)

Purpose: an authoritative central resource to 1) provide a solid interactive foundation for wellness programs and 2) expose the deficits in knowledge to promote future health behavioral research

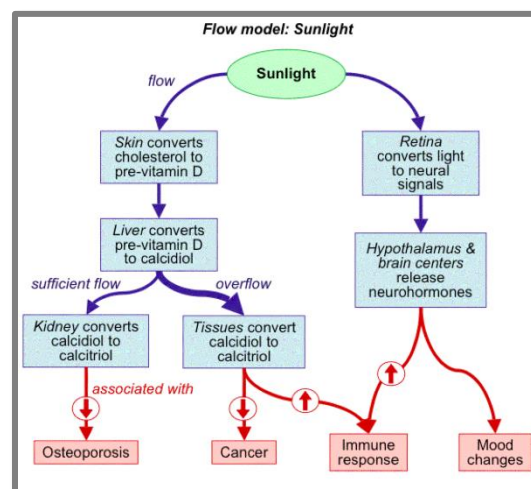
Intended impact. By identifying essential lifestyle choices based on fundamental human physiology this HBKB is intended to be an authoritative central resource that will help change the model of health care by validating the critical impact of lifestyle behaviors, thus giving physicians more confidence in prescribing lifestyle changes before turning to drugs and surgery and other medical options.

To the extent the HBKB is used in medical school training and by physicians, it will *help change the healthcare model and health outcomes starting from the “top down”*. To the extent patients using the HealthE•D•D solution become informed health advocates who can participate in their own wellness and pressure their doctor to look at ways to include lifestyle medicine into a routine clinic visit it will *help change health outcomes and the healthcare model from the bottom up”*.

Physio-Flowcharts: The Bridge

Based on an extensive literature review of thousands of articles and a preliminary database for about 16 lifestyle categories that support behavioral and addiction change models, we specifically designed physio-flow charts to demonstrate how the body works right if it gets what it needs and conversely to identify that tipping point in the physiological cascade when things start going awry when the body doesn’t get the lifestyle “nutrient” it needs.

These flowcharts are the foundation of the knowledge base and the heart of our educational system serving as a bridge between the two. Our 2 dozen physio-flow charts are our unique creation and our most proprietary intellectual property.

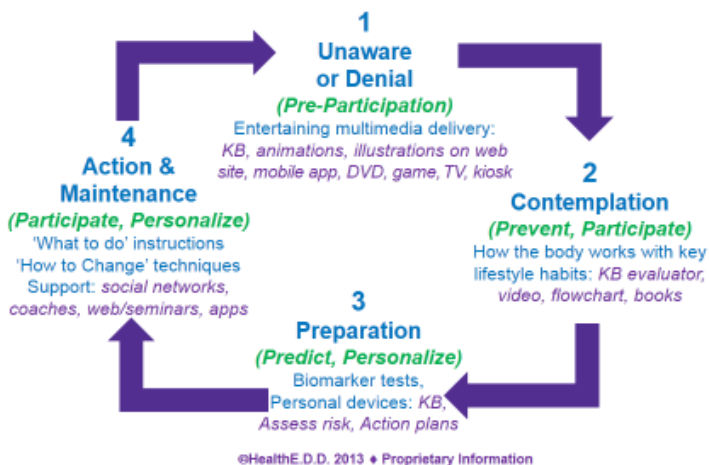


About The Engaging, Multimedia Delivery System

Purpose: a model health promotion program encouraging 1) inventive wellness programs and 2) robust outcome studies investigating educational techniques, behavior change and social networks.

Intended impact. The engaging delivery system will provide a breakthrough for health promotion efforts and health education programs in schools by helping people take responsibility for their own health with this enjoyable, easy-to-use multimedia delivery system that inspires and seamlessly integrates behavior change techniques with lifestyle choices. When implemented it can help corporations and individuals both reduce health care costs and change the model of health care by promoting lifestyle changes before turning to turning to drugs or surgery. To the extent animations and information are sent through social media, it will *help change health outcomes from the “bottom up”*.

BEHAVIOR CHANGE USE CASE
How P4 & HealthEDD contribute to each stage/category



HealthE•D•D Relationship with other Healthcare Initiatives

HealthE•D•D is uniquely poised to provide the innovative, scientific wellness strategies recommended by *Personalized-Lifestyle-Integrative-Functional Medicine, the Affordable Care Act, and community and public health wellness programs* and to augment each of the 4 Ps: prediction, prevention, personalization, participation—all without the need for FDA approval, so it can be developed and implemented quickly. We will form strategic partnerships with P4-Lifestyle Medicine practitioners. **See APPENDIX for more info.**

➤ Since poor lifestyle choices account for the vast majority of healthcare costs, integrating lifestyle behaviors into medical models and testing is the key to unlocking the causal factors of chronic disease.

“When we doctors go to medical school, we are taught basic physiology the 1st year. That teaches us how the body normally works. The 2nd year we are taught what goes wrong with the body. The 3rd and 4th years, we are taught to forget most of the first two years and memorize symptom complexes as ‘diseases’. We are then taught which drugs cover up the symptoms of those diseases. When that doesn’t work, we are taught to attempt to remove the offending part. – Dr. Jerry Tenant, Tennant Institute for Integrative Medicine, Dallas TX

Potential Markets & Partners

The ultimate end-user will be individuals, but the most effective way to reach people, particularly those most needing health promotion information is through third party sources: their health care providers or employers or eventually governmental agencies or schools. **See MARKET ANALYSIS for more info.**

The *corporate market (over 600,000)* is well established: 80% of companies over 50 employees and 92% over 200 employees have Wellness Promotion programs with an ROI averaging 4:1.¹⁰ But this market is crowded, focused on reporting, with less than 20% of eligible employees participating.¹¹ A better strategy is to target those *health promotion companies (perhaps 300)* supplying the corporate market to give them a competitive edge with our unique delivery system and our exclusive knowledge base.

Insurance companies & HMOs (over 4,000) have become a primary economic driver of healthcare in this country. HMOs, along with corporations, have the largest financial incentive to reduce costs.

The strongest market may be the equally large *health care professionals group (over 580,000) and medical schools*. Our program will be a uniquely helpful tool for physicians not trained in lifestyle counseling, can’t get reimbursement given current insurance codes, and therefore can’t take the time.

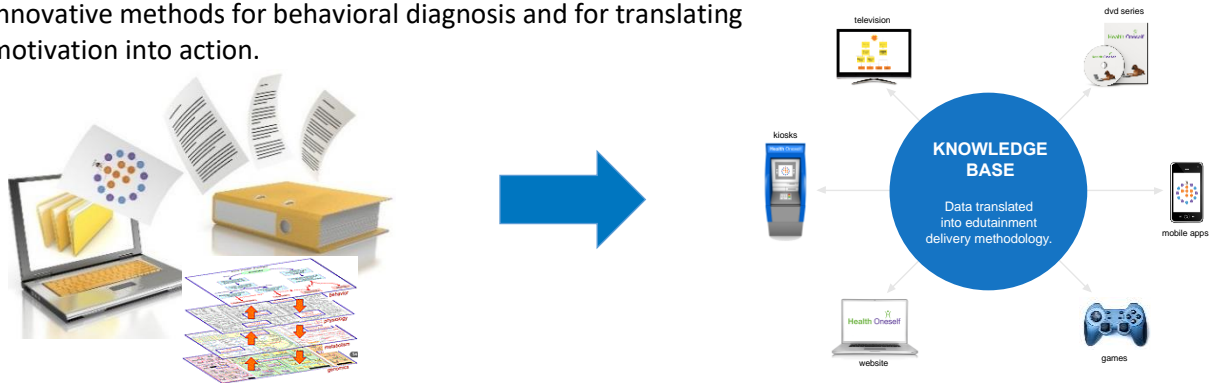
Schools (over 105,000 schools) and children are the preferred market to educate while young, but that will take special funding to develop material targeted to different age groups. Applying the latest science in a fun delivery model allows games promoting health to resonate with tech-savvy students—and adults.

Governmental Agencies and Mandates, particularly the U.S. Department of Health and Human Services (*over 300 programs*) including health and social science research, Medicare and Medicaid, plus services administered through a variety of agencies mandated to promote health. The VA could be a particularly effective strategic partner for using HealthE•D•D-based products and developing outcome studies.

Consumers Direct (158 million Internet users seeking health info and about 41 million “LOHAS”—Lifestyles of Health and Sustainability—in a \$209 billion market). Targeting the health-interested community presents the largest market opportunity but it is also the most expensive for a new launch and consumers are less likely to make this type of purchase decision without third-party influence. But it is an enormous potential market that could be reached via effective animations and buzz on social media for web subscribers and creative coaching alliances. Mobile apps, kiosks and TV shows and TV “shorts” may be other potential mass market applications of the HealthE•D•D-based program.

Summary: HealthE•D•D Uniqueness and Advantages

What it does. HealthE•D•D is a *breakthrough in public health information and wellness promotion* that features knowledge engineering, edutainment, behavioral strategies and social media to create an engaging array of products and services to modernize and revolutionize the healthcare system. Its scientific, validated knowledge base maps behaviors and biological consequences to identify specific lifestyle behaviors for prevention and wellness strategies and with the engaging delivery system it provides new and enhanced behavior change techniques that give both physicians and consumers innovative methods for behavioral diagnosis and for translating motivation into action.



Societal Need. Since poor lifestyle accounts for the majority of healthcare costs, understanding lifestyle behaviors is *key to unlocking the causal factors of chronic disease*. Personalized Medicine is leading the way in developing new and effective diagnostic tools that help find disease at earlier and earlier stages. But there needs to be a new kind of diagnostic, one that takes lifestyle into consideration and can be directly mapped to changes in biomarkers—just what the HealthE•D•D solution can do.

Fit with Modern Technology. Scientifically validated prevention methods help move the entire healthcare industry from a one-size-fits all system to a *value-based system*. Taking advantage of modern technology tools healthcare can tap into the power of smart patients with smart phones and devices that can be used to monitor vital signs, connect with sensors and provide a vast repository of health and healthy behavior information. The convergence of wireless technologies, social media as well as low-cost monitoring devices and sensors give consumers a big opportunity to take control of their own wellness. HealthE•D•D can take advantage of widespread adoption of digital devices by doctors and patients to manage health, and extends that reach exponentially by *layering in lifestyle behaviors with a new breed of medical diagnostics*.

Advantages for Healthcare. Such a lifestyle knowledge base has never been done before and the impact will be the behavioral equivalent to the Human Genome Project. When *medical science teams up with behavioral science a truly holistic medicine* can emerge. The system can be built within a few years to inform patients and physicians *without FDA approval* since this will be an educational health tool in the first stage. It creates structure and evidence to leverage the P4 and Lifestyle Medicine models as *the models for 21st Century health*. Outcome studies can demonstrate the value of various lifestyle behaviors and the value of health promotion translates into greater value for limited money and proof of concept for future leveraging to improve health care and reduce costs.

HealthE•D•D Vision. Within each market, the HealthE•D•D solution takes both a top-down and a bottom-up view of healthy living whether influencing doctors or consumers through a wellness program based on assessable science with an engaging delivery model enhanced by social media. In this way HealthE•D•D puts pressure on the healthcare system to factor in lifestyle behaviors while educating informed consumers who will in turn demand lifestyle medicine from their doctors to stay healthy.

HealthE•D•D, LLC ORGANIZATION

Dr. Norwood has spent \$300,000 to assemble a product development management team to:

- Conduct an extensive literature review and created a preliminary database for 16 key lifestyle categories that support behavioral and addiction change models.
- Develop several dozen physio-flowcharts that maps how the body works with each key lifestyle behavior and identifies health consequences of lifestyle choices.
- Create website mockups and prototype animations, illustrations, and content.

Marel Norwood, Founding Director, PhD Social-Organizational Psychology University of Washington: 30+ years research, teaching, management in health care and business (including UW Medical School and Boeing), and independent consultant for a wide variety of clients in business and government.

Dan Cook, Knowledge Base Director, MD, PhD Physiology and Biophysics: 30+ years Research Professor at the University of Washington in Physiology, Biological Structure, and Structural Informatics building multi-scale bio-simulations of human physiology and pioneering bioinformatical software.

Scott Buesing, Research and Quality Control, ND Bastyr Univ.: 8+ years medical practice, 11+ years critical analysis of medical literature, research focused on lifestyle practices for optimal wellness.

Donna Vaudrin, Training & Coaching, EdD Educational Leadership, Seattle University: 30+ years as Dean for Students, Training Director, Independent Management Consultant.

Chad Essley, Independent animation and illustration director-instructor: 18+ years in commercials, multimedia, television and games; CINE Golden Eagle award.

Gilmore Research Group, full-service research firm with a healthcare division, founded 1948.

COMPETITION	Lifestyle Knowledge Base	All key lifestyle categories	Focus on how the body works	Video – Edutainment	Change Resources
HealthE•D•D	✓	✓	✓	✓	✓
Health Info Websites	—	—	—	~	—
Health Coaches	—	—	—	—	~✓
Corporate Wellness Promotion Programs	—	—	—	—	~✓
Wellness Motivation & Support Apps-Websites ¹²	—	—	—	~	~✓

Next Steps

HealthE•D•D needs to raise approximately \$5 million to build and beta test the knowledge base and self-evaluator tool, build a website to run the HealthE•D•D system, and create and deliver clever and catchy health education materials appropriate for whichever initial groups are targeted by the investor. We have a phased product development plan dependent on investor interest. Budget available on request.

HealthE•D•D has spent several years building a dynamic product development team to deliver on the promise of improved health through lifestyle modification. But to grow this concept into a business and secure a place in the national healthcare discussion, HealthE•D•D must enlist the help of seasoned business veterans who can open and grow new markets and guide the product development. The product development team is ready to build the knowledge base, self-evaluator and “edutaining” materials but would greatly benefit from the wisdom of a CEO, a marketing director and web design team, as well as a research firm for independent product concept and beta testing.

This innovative product will be a part of the real solution to the health care crisis and be profitable for investors who wish to do well by doing ‘good’. We are seeking funding to bring this vision to fruition.

REFERENCES

¹ See footnote #1

² Gates Foundation (2010) see <http://docs.gatesfoundation.org/global-health/documents/global-health-strategy-overview.pdf>; The Lancet “Global Burden of Disease,” vol 346 (1997)

³ Pew Internet & American Life Project. “Internet Activities.” July 22, 2008; and Plunkett Research. “Information Technology and Health Care” (2007)

⁴ See footnote #6

⁵ See footnote #2

⁶ See footnote #4

⁷ Ross DeVol et al, An Unhealthy America: The Economic Burden of Chronic Disease, Milken Institute October 2007: *along with other institutions and physicians, observes that the health crisis in the U.S. is driven by a systematic failure of healthcare to prevent illness and disease or to address the fundamental causes of chronic and other illnesses. Plus the Institute of Medicine reported study results which revealed that only approximately 4% of all medical treatments have strong evidence to support their use. More than half have weak evidence or no evidence at al. (Millenson)*

⁸ *Errors caused by physicians, hospitals, drugs, and medical procedures are a huge issue. More than 250,000 deaths can be attributed to the U.S. healthcare system every year (the country’s third-leading cause of death), and the incidence of this iatrogenic illness and injury is much larger. see Dr. Starfield, Barbara. Journal of the American Medical Association. Volume 284. July 26, 2000; Catlin, A., C. Cowan, M. Hartman, et al. 2008. National Health Spending in 2006: A Year of Change for Prescription Drugs, Health Affairs, 27(1): 14-29.*

⁹ See footnote #7

¹⁰ See footnote #9

¹¹ Mattke, S., et al., “A Review of the U.S. Workplace Wellness Market” Rand Corp. (2012) for Dept. of Labor.

²² Examples: Limeade <http://www.limeade.com>; Zensey <http://www.zensey.com>; Fitlinxx <http://www.fitlinxx.net>; see also <http://greatist.com/health/most-innovative-health-fitness-and-happiness-startups>

Lifestyle-Integrative-Functional Medicine

A few doctors have begun looking at “Lifestyle Medicine” as a way to reduce lifestyle-related death and disease through clinician-directed interventions with patients.² Several medical schools, including Harvard, Duke and Northwestern have adopted Lifestyle Medicine programs but it is still considered specialized training and not something most medical schools offer. Two organizations are the American College of Lifestyle Medicine (2004) and The Institute of Lifestyle Medicine (2007). A small but growing group of doctors practice “Integrative Medicine” and/or “Functional Medicine”, which include lifestyle behavior indicators. They emphasize disease prevention and health promotion by encouraging lifestyle changes and health education efforts.

There are still significant barriers to doctors writing lifestyle prescriptions. Many doctors lack confidence, skills and training when it comes to lifestyle behaviors. Most healthcare providers have no way to categorize lifestyle when it comes to insurance payments. Doctors diagnose by code numbers, which activate standards of practice. If it isn't in the system it can't be treated unless a doctor can justify another code. Currently there is no mechanism for lifestyle-related therapeutic interventions. A true paradigm shift will occur when insurance starts billing for outcomes rather than medical services.

HealthE•D•D Advantage. We aim to be a leader in this endeavor primarily in providing the foundational research and knowledge base for training for health care providers and the basis of coding changes for lifestyle interventions. Our Lifestyle Knowledge Base and website will be a useful resource for all medical practitioners since most physicians are not trained in lifestyle counseling, and given current insurance codes, can't get reimbursement and therefore can't take the time. HealthE•D•D materials can be tailored for the medical community, both for *medical schools and continuing education* for practicing physicians. Lifestyle-Integrative-Functional Medicine practitioners will be certainly be *strategic partners*.

Personalized Medicine

According to Dr. Leroy Hood¹ the convergence of systems biology, the digital revolution and consumer-driven healthcare is transforming medicine from a current reactive state focused on treating disease to a proactive personalized approach. His approach is called P4 Medicine: predictive, preventive, personalized and participatory. So far, most of the emphasis has been on prediction—developing the genomic and proteomic tests to identify the development of disease. While they recommend lifestyle strategies to reverse or prevent what the personalized predictive test reveal, they don't offer any particular lifestyle wellness strategies, which are a much cheaper than to-be-developed biological wellness strategies.

HealthE•D•D Advantage. We are uniquely poised both to provide wellness strategies and to augment each of the 4 Ps: by adding behavioral maps and multiscaling to genomic and proteomic testing we can create enhanced *personalized* knowledge bases to enhance *prediction* and identify the most likely behavioral and other wellness strategies to enhance *prevention recommendations* and, along with enriched learning and social communication networks, consumer *participation*.

Wellness/health promotion programs: corporate, community, government

In the U.S. 80% of corporations with more than 50 employees offer some kind of wellness program. Yet, corporate health promotion plans emphasize reporting, risk assessment, individual action plans, etc., rather than the quality, comprehensiveness, or effectiveness of lifestyle information (which is woefully flawed), and how the body works/physiology is almost never discussed. Most wellness programs deal with limited content areas (diet/weight control, exercise, tobacco/alcohol cessation, stress management) delivered by newsletters or websites which lack comprehensive, validated resources or interest or engaging content—a SIGNIFICANT disadvantage since success depends on user participation.

HealthE•D•D Advantage. Health promotion using the HealthE•D•D solution will be scientifically validated and standardized, capable of identifying lifestyle behaviors with biomarker diagnostics which will provide information about behaviors on which employees/consumers should focus to improve their health and decrease illness, and providing user-friendly health promotion tools that engage and motivate end users. Because our knowledge base can associate lifestyle behaviors with biomarkers and health consequences, outcome studies and P4/Lifestyle/Integrated medical models become more viable.

Legislation: The Affordable Care Act (ACA)

Passage of the Affordable Healthcare Act signals a shift toward Prevention,³ the second “P” in P4 Medicine. But as it stands the ACA just expands an already flawed model of care that has been and continues to be one of the leading causes of death in the U.S.⁴ and is controlled by insurance companies and HMOs. A recent review of U.S. healthcare expenses revealed that 30 cents of every dollar spent on medical care is wasted, adding up to \$750 billion wasted annually.⁵

But simply putting money into preventive services rather than health promotion is not the answer. “A 2010 study calculated that if 90% of the U.S. population used proven preventive services, more than do now, it would **save only 0.2 percent** of healthcare spending...The failure of many preventive services to improve health, plus the large number of people who have to receive preventive care for one to be spared an illness...limit the economic savings.”⁶ (See discussion in citation in References). So clearly the only viable solution is health promotion: changing peoples’ behavior and culture.

Since the Affordable Care Act emphasizes prevention, what makes a prevention program *pioneering, robust and health promoting*? We believe it does so:

- Directly, by identifying specific lifestyle behaviors for specific prevention/wellness strategies—which has never been done, but can be done with a Healthy Behaviors Knowledge Base.
- Indirectly, by enhancing prediction, personalization and participation—not done as proposed below.

HealthE•D•D Advantage. We can be a leader in wellness strategies for all ACA-associated organizations with a *robust pioneering health promotion program* that includes the following unique elements:

- *Biomarker integration:* tie behaviors to biomarkers using standard blood/body fluids tests with multiscale integration to understand and enhance prediction for all levels of biological networks
- *Behavioral diagnosis:* cross-discipline integration, map how behaviors and other inputs perturb problem-specific physiological pathways, and identify behaviors for specific health outcomes
- *Behavior change techniques:* new and enhanced strategies that handle differences in motivation, learning type, age, gender, culture, etc.
- *Activated social networks:* new and enhanced materials and techniques for social networks that ‘hook’, captivate, educate, motivate, communicate, and enrich bonding

Regulation: The Food & Drug Administration

The FDA is tasked with regulating biologically-derived tests and prediction models such as those to be used in P4 Medicine, slowing down the application of the to-be-developed genomic and proteomic tests.

HealthE•D•D Advantage. Because the HealthE•D•D knowledge base and query system will be at an “educational quality” as first developed, it requires no regulation so this information gets to physicians and consumers much more quickly.

Ultimately, we plan to develop a computerized expert system in lifestyle-health consequences that extends the reliability, validity and range of the Healthy Behaviors Knowledge Base to actual “prescription quality” for physicians, and to enable not only confidence, but legal protection in writing

prescriptions for lifestyle behaviors before drugs or surgery. This will require FDA approval, but also will require funding toward the scale of The Human Brain and The Human Genome projects.

REFERENCES - APPENDIX

¹ <http://p4mi.org/p4medicine>

² <http://www.instituteoflifestylemedicine.org/about-the-ilm>

³ Barack Obama's Plan for a Healthy America see <http://www.centerforpolicyanalysis.org/id25.html>

⁴ *Errors caused by physicians, hospitals, drugs, and medical procedures are a huge issue. More than 250,000 deaths can be attributed to the U.S. healthcare system every year (the country's third-leading cause of death), and the incidence of this iatrogenic illness and injury is much larger.* see Dr. Starfield, Barbara. *Journal of the American Medical Association*. Volume 284. July 26, 2000. And Catlin, A., C. Cowan, M. Hartman, et al. (2008) National Health Spending in 2006: A Year of Change for Prescription Drugs, *Health Affairs*, 27(1): 14-29.

⁵ The Institute of Medicine, *Best Care at Lower Cost: The Path to Continuously Learning Health Care*, September 6, 2012

⁶ *Think preventive medicine will save money? Think again*" Reuters (2013). Obtained at <http://www.reuters.com/article/2013/01/29/us-preventive-economics-idUSBRE90S05M20130129> "Preventive care is more about the right thing to do" because it spares people the misery of illness... "But it's not plausible to think you can cut healthcare spending through preventive care... One big reason why preventive care does not save money, say health economists, is that some of the best-known forms don't actually improve someone's health...Some disease-prevention programs do produce net savings. Childhood immunizations...and counseling adults about using baby aspirin to prevent cardiovascular ...Those, however, are exceptions. These low- or no-benefit measures include annual physicals for healthy adults, some cancer screenings.... The second reason preventive care brings so few cost savings is the large number of people who need to receive a particular preventive service in order to avert a single expensive illness... If preventive care could be provided only to those who are going to get the illness, it would be more cost-effective... The failure of many preventive services to improve health, plus the large number of people who have to receive preventive care for one to be spared an illness he or she would otherwise get, limit the economic savings"...For preventive medicine to help rein in the nation's soaring healthcare spending, it should be provided someplace other than doctors' offices.

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Passage of the Affordable Healthcare Act signals a shift toward Prevention,³ the second "P" in P4 Medicine. But as it stands the ACA just expands an already flawed model of care that has been and continues to be one of the leading causes of death in the U.S.⁴ and is controlled by insurance companies and HMOs. A recent review of U.S. healthcare expenses revealed that 30 cents of every dollar spent on medical care is wasted, adding up to \$750 billion wasted annually.⁵

But simply putting money into preventive services rather than health promotion is not the answer. “A 2010 study calculated that if 90% of the U.S. population used proven preventive services, more than do now, it would **save only 0.2 percent** of healthcare spending...The failure of many preventive services to improve health, plus the large number of people who have to receive preventive care for one to be spared an illness...limit the economic savings.”⁶ (See discussion in citation in References). So clearly the only viable solution is health promotion: changing peoples’ behavior and culture.

Since the Affordable Care Act emphasizes prevention, what makes a prevention program *pioneering, robust and health promoting*? We believe it does so:

- Directly, by identifying specific lifestyle behaviors for specific prevention/wellness strategies—which has never been done, but can be done with a Healthy Behaviors Knowledge Base.
- Indirectly, by enhancing prediction, personalization and participation—not done as proposed below.

HealthE•D•D Advantage. We can be a leader in wellness strategies for all ACA-associated organizations with a *robust pioneering health promotion program* that includes the following unique elements:

- *Biomarker integration:* tie behaviors to biomarkers using standard blood/body fluids tests with multiscale integration to understand and enhance prediction for all levels of biological networks
- *Behavioral diagnosis:* cross-discipline integration, map how behaviors and other inputs perturb problem-specific physiological pathways, and identify behaviors for specific health outcomes
- *Behavior change techniques:* new and enhanced strategies that handle differences in motivation, learning type, age, gender, culture, etc.
- *Activated social networks:* new and enhanced materials and techniques for social networks that ‘hook’, captivate, educate, motivate, communicate, and enrich bonding

Regulation: The Food & Drug Administration

The FDA is tasked with regulating biologically-derived tests and prediction models such as those to be used in P4 Medicine, slowing down the application of the to-be-developed genomic and proteomic tests.

HealthE•D•D Advantage. Because the HealthE•D•D knowledge base and query system will be at an “*educational quality*” as first developed, it requires no regulation so this information gets to physicians and consumers much more quickly.

Ultimately, we plan to develop a computerized expert system in lifestyle-health consequences that extends the reliability, validity and range of the Healthy Behaviors Knowledge Base to actual “*prescription quality*” for physicians, and to enable not only confidence, but legal protection in writing

prescriptions for lifestyle behaviors before drugs or surgery. This will require FDA approval, but also will require funding toward the scale of The Human Brain and The Human Genome projects.