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Articles regarding diagnosis, treatment and practice of medical psychology for prevention and amelioration of disabling conditions or human suffering are welcomed. Documentation of current practices in the diagnosis, treatment and prevention of health disorders is essential for the development of techniques and methods of medical psychology and may be given preference. Issues dealing with the economics of access to health care, the political aspects of the scope of practice of medical psychology and comparison of techniques of diagnosis and treatment in healthcare are within the purview of this Journal. Articles dealing with the education, training and advancement of medical psychology in the public interest are included in the broad-spectrum of the definition of medical psychology. How advancements in other scientific fields will affect medical psychology will be considered for publication. The Journal also publishes timely brief reports of research germane to medical psychology and health care.

The Archives of Medical Psychology has chosen the electronic online medium for prompt distribution of articles of interest in medical psychology. Electronic transmission offers advantages of speed and economy for the distribution of important scientific works pertinent to medical psychology. The purpose of the Journal is to deliver accurate state-of-the-art information as quickly as they can be prepared. Therefore, articles will be published when they are deemed ready for publication and will not be collected and held to arbitrary publication dates. Subscribers to the Journal will be notified when new articles are published online. The page numbers of the articles will be in consecutive order in the Volume of the year in which they are published.

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Reference Style examples

Muse M & McGrath R. Training comparison among three professions prescribing psycho-active medications: Psychiatric nurse practitioners, physicians, and pharmacologically-trained psychologists. *J CI Psycho*. 2010, 66, 1-8.

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Editorial Comment

Jerry Morris, PsyD, MBA, MsPharm, ABMP, ABPP

High Steet Clinic, Butler, MO

In all editions of The Archives of Medical Psychology you will find some of the renowned leaders historically in the Practitioner Movement in Psychology. You will find authors and contributors who have been APA Presidents, APA Council Members, Presidents of State Psychological Associations, authors of practice books and thousands of congregate practice articles, entrepreneurs who have developed psychological clinics, psychiatric hospitals, and who have lobbied Government at the State and National level passing laws favorable to the practice of psychology. You will find Carl Heiser Advocacy Award winners of the most prestigious award in advocacy in psychology. You will find authors who have been licensed in multiple states and who have pioneered and refined psychology training and delivery systems. You will find leaders who have opened up Hospital Practice, Primary Care Practice, helped foster the shift to Integrated Care Models, and who have helped usher in and define the RxP movement and training in psychopharmacology, and who developed the specialty of Medical Psychology, and who have a track record of helping to found and develop practice Divisions in APA. You have seen Archives contributions from members of the Famed Dirty Dozen that led to the establishment of an APA Practice Directorate, from individuals involved in the Practitioner Movement at the time that the small group of psychologists accomplished the famed Virginia Blues lawsuit and got us all in vendor and payment status with insurers. You have read material from authors intimately involved with advocacy when Dr. Bryant Welch, our last very effective executive for the APA Practice Directorate, along with Dr. Donna Daily and practitioners lobbied us into Medicare, and got us parity with psychiatrists in legal testimony.

Paramount among these authors, they have often been founders of the national practitioner association in psychology (www.nappp.org) and have given practitioners a place that represents them without dual roles and conflicts of interest.

Readers are regularly treated with contributions from these historical giants in the Practitioner Movement!

In this edition of The Archives you will be treated with another seminal historical leader in the Practitioner Movement and his colleagues who changed the face of practice. Dr. Stephen Berger and the California Association of Psychology Providers (CAPP) courageous leadership, sacrifice, and accomplishments were one of the foundations of our ultimate ability to have hospital practice, independent functioning as full specialists in hospital and residential facilities, and positioned us for Integrated Care. Dr. Berger and the CAPP group are foundation champions for the eventual inclusion of psychologists as “required staff” in the nation’s hospital and primary care system. To the practitioner community he is more famous and important than many of the Great Presidents of APA, great psychologist scientists, and people taught in required history and systems classes in psychology doctorate programs (which summarily neglect the history of the Practitioner movement). He compares favorably with Practitioner Giants of Leadership like the Dirty Dozen, Members of the Vail (Practitioner-scientist) Conference and movement, and others who have fought the wars for practitioners. In my eleven years as the Chair of the Hospital and Healthcare Facilities Committee for the APA Division 42, time on and founding the Rural Health Committee at APA, and on the APA Finance Committee, I used Dr. Berger and his CAPP col-

leagues work to try to push APA in the direction of appreciation of the Practitioner Movement and the realization that the movement has had to accomplish the greatest things for practitioner psychologists OUTSIDE of APA, and AGAINST MUCH INTERNAL RESISTANCE and FAIGNT SUPPORT! I failed to get meaningful change inside APA for the Practice Movement, but the movement remains alive as long as we educate the young practitioners about its history and have the type of courageous individuals like Dr. Berger—and important colleagues who contributed and worked alongside him whom he names and credits in his article that are required to move it forward!

Dr. Berger continues to be a driving force preparing the new generation of practicing psychologists providing them training via his position at the American School of Professional Psychology at Argosy U!

Those interested can learn more about CAPP by going to: capp.nappp.org

Fighting for Psychology: From Hospital Privileges to Prescribing Privileges (RxP)

Stephen E. Berger, PhD, ABPP

American School of Professional Psychology at Argosy University, Southern California

It Begins

Recently, I wrote an article for *The National Psychologist* (Berger, 2014) briefly reviewing the details of the fight for hospital privileges in California in the late 1980s into the 1990s and pointed out connections with the efforts for prescribing rights (RxP). Developments related to organized medicine's response to psychology's victory in California led directly to the efforts by California psychologists to obtain prescribing rights (RxP). In this article, I have been requested to provide more of the details of the hospital privileges battle and a bit more of the RxP connection than I had space to do in my other recent article. Much of what follows in the beginning of this article was first reported in an article that I published in *The Independent Practitioner* (Berger, 1992).

One of my goals in this article is to provide an up-dated account of some of the history of the hospital practice battle in California because too often the history of our profession's battles get buried in old publications and buried with those who created the history. Consequently, as I did in my 1992 article, I will continue to mention the names of individuals of whom I am aware who participated in the struggle, as I suspect there is more than a generation or two of psychologists who will not be going to read the 1992 publication. In addition, as I recount some of that history, I can do so with an awareness of how that history connected directly to the efforts in California for RxP, something that had not happened yet when I wrote the 1992 article. I also have the challenge of not plagiarizing my own publications!

Despite my effort to not plagiarize my own work, in a moment, I will quote from the beginning of the earlier publication as it so clearly showed how I got involved in the hospital privilege battle in California: "A couple of us are filing an action against the California Department of Health Services (DHS). They have a regulation that prohibits psychologists from writing a hospitalized patient's diagnosis and treatment plan. We're looking for some other individual psychologists who hospital practice to lend their names to the action. This shouldn't be a big deal, and you won't be responsible for legal fees." That was my memory at the time as to what Steve Frankel, Ph.D., ABPP, JD said to me when he "... made me an offer I couldn't refuse." As a quick aside, the first update from the 1992 article is adding the JD designation to Dr. Frankel's list of credentials/accomplishments.

As I understand it, a legal strategy decision had been made to add the names of individual psychologists to the law suit against DHS. I can add to the earlier article that the law-suit was filed by an entity that had recently been formed: the California Association of Psychology Providers (CAPP). I am pleased to tell you that CAPP still exists, thrives, operates in the black and retains reserve funds eventually obtained as a result of having filed the law suit—but more about that later. You can learn more about CAPP from the website: capp.nappp.org. In any event, that is how I became one of the eight CAPP v. Rank individually named plaintiffs (in what is commonly referred to as: CAPP v. Rank) along with Drs. Stuart Wilson, ABPP, Lawrence Blum, Gary Bodner, Steve Frankel, Corey Fox, Lisa Pomeroy, and Carleton Purviance.

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If you access the original 1992 article, you will learn that it was written at the request of Kris Ludwigsen, Ph.D. when she was Chair of the Division 42 Hospital Practice Committee. I was asked to share my experiences as a plaintiff as well as what we the Orange County Psychological Association had contributed to the case, and what we had accomplished in getting CAPP v. Rank implemented in Orange County. One of the most interesting aspects to this battle is a separate but related development in hospital practice work. As you know, with the progression of managed care, hospital practice work has been greatly curtailed for all mental health professionals. The way I like to express this development is: While organized medicine was standing on the front steps to the hospital blocking our entry, managed care was behind them boarding up the doors of the psychiatric hospitals. Congratulations to organized medicine's leadership.

The Legal Issue

The history goes back to 1978 when the California legislature added Section 1316.5 to the Health and Safety Code. That is the set of California laws that regulate hospitals. The problem was that at the time, California law was not explicit as to whether hospitals could permit psychologists to independently practice at hospitals. Consequently, some hospitals took the position that since the law did not say no, that it was appropriate to appoint psychologists to the staff. Other hospitals took the position that since the law did not say yes, that it was not appropriate to grant hospital privileges to psychologists. Consequently, the Legislature made it explicit that hospitals could appoint psychologists to the "professional" staff of the hospital. For the purpose of psychologists' hospital practice rights, the Legislature referred to "clinical psychologists." However, there was not a legal definition in California of the words "clinical psychologist." Therefore, the last section of 1316.5 defines the words clinical psychologist for the purpose of independent hospital practice. For convenience, sometimes I will explicitly use the full terms clinical psychologist, other times I might simply write psychologists, but at all times, you should understand that for independent hospital practice in California, the licensed psychologist must meet the legal definition of clinical psychologist as delineated in Section 1316.5 of the Health and Safety Code.

Needless to say, some hospitals took the position that they would appoint psychologists to an "allied" health staff, but not to the regular "medical" staff. The implications are two-fold, but ultimately, both implications mean that psychologists would make less money than they could if they were on the regular medical staff: 1. without medical staff membership, psychologists could not be the admitting doc and would therefore have to turn over control of the patient's care to a psychiatrist. Consequently, how often the psychologist could see her or his patient was determined by the psychiatrist; 2. without medical staff membership and thus not being able to get credit for admitting patients to the hospital, psychologists would not be on the hospital's referral list and thus another source of income was denied. Of course the justification for these discriminatory actions was that us psychologists were not competent to be in charge of our patients. Of course, the same argument is asserted in regard to RxP.

In creating Statute 1316.5, the Legislature provided an introductory statement as to the rationale for the law. This rationale became very important when CAPP v. Rank was heard at the California Supreme Court in 1990. One of the main position statements of the Legislature was the affirmative and unambiguous statement that from the Legislature "psychology to be an independent health profession." That wording is crucial because if one is an independent health professional, then one cannot be required to be under the supervision of another profession.

Because hospitals were not complying with the spirit of the law, the Legislature amended Section 1316.5 in two ways in 1980. First, 1316.5 was amended to explicitly state that psychologists could be appointed to the medical staff of the hospital. The second change to the law was a somewhat awkwardly worded statement that meant that if a hospital offers a service that is in the license of psychologists, then the hospital must allow psychologists to perform such services “without discrimination.” I think of 1316.5 as our “Hospital Practice Law” (Berger, 1991c).

Meanwhile, Regulations (Administrative/Regulatory Laws) to implement 1316.5 had to be written and adopted by the Department of Health Services (DHS). Public hearings were held in accordance with California law on the proposed Regulations. One of those Regulations stated that either a physician or a clinical psychologist could designate a patient’s diagnosis and treatment plan. Unfortunately, after the public hearings, DHS suddenly, and without proper notice, struck the words permitting a psychologist to designate the patient’s diagnosis and treatment plan. Wow.

Technically, CAPP v. Rank was about two specific Regulations promulgated by DHS. The Statute states: (a) clinical psychologists may be on the Medical Staff of a hospital and (b) hospitals may not discriminate against clinical psychologists in terms of services within the scope of our license. Despite clear state law (Statute), DHS promulgated regulations that only a psychiatrist could make a patient’s diagnosis and treatment plan. A decision was made to challenge the Regulation by California psychologists, who created a new state-wide organization that was named the California Association of Psychology Providers.

The Heart of CAPP v. Rank

Let me quote from my 1992 article because I like the way I made the point back then: “The core of CAPP v. Rank goes much deeper than the technical issues outlined above.” Bryant Welch, J.D., Ph.D., Executive Director of the APA Practice Directorate, and a key participant in CAPP v. Rank stated, “While the concrete value ... is only slowly seeping into the economic structure of professional psychology, the symbolic value has been of crucial importance to our young professionals who now realize that through earnest advocacy efforts they can prevail, particularly against those psychiatrists who confuse their license to practice with a legal patent, which bestows monopolistic rights.” (Welch, 1991).”

The fundamental issue in CAPP v. Rank is our belief about ourselves as psychologists. The fundamental issue is whether we believe that we have the knowledge, training and competence to form the kind of therapeutic relationship with our clients/patients that permits (requires ?) us to have the ultimate responsibility for their psychological care? No one questions that perspective on an out-patient basis. The question in CAPP v. Rank was whether we believe we are competent to be in charge of the care of our hospitalized patients. Those of us who fought this battle on the front line are committed to the position that properly trained and experienced clinical psychologists are competent to form a therapeutic relationship with our patients so as to be responsible for the psychological care of our clients/patients (Berger, 1991b). The California Supreme Court directly addressed the importance of our existing relationship with our patients and affirmed our position in two distinct places in the CAPP v. Rank decision in 1990.

Implementing CAPP v. Rank

The following is mostly taken from my 1992 article. The sequence of events was a hearing in Superior Court in July, 1985 regarding the DHS regulation that clinical psychologists could not designate a patient’s diagnosis and treatment plan. The Superior Court judge ruled in our favor that the regulation was in violation of the Statute (1316.5 of the Health

and Safety Code) that recognized psychology as an independent profession and authorized Medical Staff privileges for clinical psychologists and non-discriminatory treatment in terms of specific privileges. DHS did not appeal the decision, and issued new regulations, so PSYCHOLOGY'S POSITION WAS THE LAW.

Since I was an individual plaintiff in CAPP v. Rank, I took on other responsibilities: (1) my role as a plaintiff in CAPP v. Rank, as the case worked its way to the California Supreme Court. (2) I also took on the lead responsibility of the implementation of CAPP v. Rank in Orange County. I will not provide as much detail here about what we did in Orange County as you can read all of the details in the original article. Consequently, I will only include a few highlights here.

In November, 1986, I became Chair of the Psychology Committee at Capistrano by the Sea Hospital. The administration at Capo took the position that the hospital's referral list was under their control and psychologists would be eligible for referrals and could also write orders. These decisions by the Administration were based on their attorney's opinion that the hospital legally had to make those accommodations to their psychologists. Consequently, psychologists on the Active Medical Staff began to receive hospital refers, which was worth about \$10,000.00 for each psychologist each year. Be clear—these turf battles are about money.

In January, 1987, Gene Ericson, Ph.D., President of the Orange County Psychological Association (OCPA) asked me to Chair their Hospital Practice Committee. I have to digress for a moment to report, sadly, that Gene is no longer with us. I will have to do that sad report for a couple of other friends who I will be mentioning. Meanwhile, although the Committee only had \$213.57 at that point, our fund eventually grew to over \$20,000.

As I wrote in 1992, "I was blessed with an especially assertive and intelligent Hospital Practice Committee at OCPA: originally Drs. Mike Trevitt, Daun Martin, Marv Rofsky, Carole Selin and Larry Meyers. Later, Drs. Michele Weil, Diane Silber, Judy Rosenberg, Robert Karman, and Roz Laudati and Mike Angioli later joined the committee. Sadly, Mike Trevitt and Marv Rofsky are no longer with us." I have lost contact with some of the others who are mentioned here.

Attorneys

In January, 1987, the psychologists at Capo hired legal counsel to get the by-laws into compliance with 1316.5 of the Health and Safety Code. As I wrote in 1992: "We did not want to do that—but we knew there was no other way." To their credit, more than half of the 70 psychologists on staff sent money to pay legal fees. At that point, my fellow psychologists and friends Drs. Jay Gale and Andrew Schwartz joined me as a legal sub-committee.

CAPP Goes to the Supreme Court

As I wrote in the earlier article: In the meantime, organized medicine had appealed our victory at the Superior Court. Although the State Supreme Court had refused to stay the Trial Court (Superior Court) order, eventually, the Supreme Court ordered the Appellate Court to hear the case on its merits. In 1988, the Second District Court of Appeal filed its opinion in CAPP v. Rank. The Court acknowledged that California law recognized the right of psychologists to treat our patients without physician supervision. However, the conditions and restrictions the Appellate Court placed on our practice could have been disastrous. Organized Psychology, especially the Practice Directorate, came to the rescue.

A call went out asking interested parties to write to the State Supreme Court urging review of the Appellate Court decision. I drafted a letter for the Orange County Psychological Association. On a Sunday, Mike Trevitt, Judy Rosenberg, Marv Rofsky and I met at Marv's office to revise the letter. We then took it to Richard Sherman of the law firm of Irell and Manella who shaped it into a formal letter to send to the Supreme Court. With our blessing, that letter was eventually adopted by the California Psychological Association as their letter. I remain proud to say that I can identify seven different points in our letter that appeared in the Supreme Court Majority Opinion in our favor.

As I wrote in the earlier article: The Practice Directorate provided us with the legal services of Clifford Stromberg of the Washington, D.C. law firm of Hogan and Hartson. Cliff became co-counsel with CAPP's attorney, Michele Licht and presented the Oral Argument in CAPP v. Rank. In Orange County, we provided the funds for Michele to get consultations with Richard Sherman of Irell and Manella. On August 25, 1988, the California Supreme Court granted CAPP's petition for review. That effectively reinstated the Superior Court Order, so we were back in business!

In Orange County, we had not been idle. Diane Silber was instrumental in obtaining full medical staff status for psychologists at Children's Hospital, one of the most prestigious hospitals in Orange County. This is a medical hospital without a psych unit! At St. Joseph hospital, Mike, Marv, Judy, Larry and Diane did the bulk of the work to bring that hospital's bylaws largely into compliance with state law. The CPC Hospital chain began to make changes in its bylaws. When Charter Hospital opened in Mission Viejo in 1990, I was invited to review their bylaws by Charter's corporate headquarters. The final bylaws granted the two most important rights of psychologists: full medical staff status and admitting privileges. Also, there would be ONE attending doctor, which would be the psychologist when admitting the patient. We would write an order specifying a consulting psychiatrist. Only a defeat at the Supreme Court could stem the tide now!

PSYCHOLOGY SPENDS AN HOUR WITH THE CALIFORNIA SUPREME COURT

In CAPP v. Rank organized medicine attacked the basic competence of our profession. They did acknowledge that psychologists are accepted as expert witnesses in a court of law, having lost that legal battle in 1962 (Hoch, E.L. and Darley, J.G., 1962 and 1964), but they asserted that hospital expertise was more important than the process in a courtroom, and that a psychologist could not be responsible for a patient's psychological care in a hospital.

We psychologists and our attorneys worked together as intimately as possible with written communications and phone conferences (pre e-mail days—can you remember?), including the President of CAPP (Steve Doyne), Chuck Faltz (Chair of CPA's Division I Hospital Practice Committee) and Bryant Welch and Russ Neuman of the Practice Directorate. There was a spirit of cooperation and respect that grows from such communication.

The night before the Court was to hear the oral arguments, Bryant Welch brought us all together for dinner. Some of us were meeting each other for the first time after years of being on this road together. Our commitment to our cause was vindicated when the majority ruled in our favor in June, 1990. CAPP v. Rank is now in the history books. Later, CAPP sued organized medicine for legal fees incurred in the case. CAPP graciously accepted a settlement that continues to fund CAPP's efforts on behalf of psychologists, as we have taken good care of this money.

The California Supreme Court Decision

While our opponents would try to obscure the meaning of the Decision and our victory, we understood the clear Decision that had been rendered. In analyzing California Law, the Decision states: “It follows that psychologists may carry the responsibility of diagnosing and treating the psychological problems of patients in hospitals.” “The ‘without discrimination’ clause signifies that in performing such services (diagnosing and treating) the two professions, each authorized by law, stand on an equal footing; neither is subject to constraints from which the other is free.” The Court was equally clear, repeatedly, that the anti-discrimination provision of Section 1316.5 applies whenever there are psychologists on the staff of the hospital.

Meanwhile, as I wrote in 1992: “... at Capo hospital, a new joint committee of psychology, psychiatry and administration was formed. In October and November, Thom Cavalli and I met with the Corporate Counsel for the CPC Corporation. We wanted all our Orange County Hospitals to grant full medical staff status and admitting privileges to psychologists. We also wanted to eliminate the mandated number of psychiatrist visits with psychologist’s patients. Why should a psychiatrist be guaranteed approximately \$2000 a month in income every time a psychologist admitted a patient to the hospital? In November, Charter Mission Viejo removed the mandated psychiatrist visits from their bylaws and written policy now stated that psychologists can choose their medical consultants including the physician for the history and physical. In December, Capo announced that as of March 1, 1991, unspecified bylaws changes would go into effect to further implement CAPP v. Rank.” You can read about further developments in the original article.

I hope that you can see that it took a lot of people to win that battle. Individual psychologists had to step up and be counted, physically as well as monetarily. The same is true of the RxP movement. The successes that have been achieved are due to the efforts of a number of people who have put themselves on the line to achieve success. The movement in California was pushed to the fore because organized medicine attempted at the last minute to slip wording into a legislative bill that could have basically overturned CAPP v. Rank and made Statute 1316.5 moot. However, the action failed.

As a result of that nefarious action, the California Psychological Association created a special Task Force to develop proactive strategies instead of simply being reactive. I served on a special Advisory Group to the Task Force. The Advisory Group recommended that CPA pursue prescription privileges. There is no doubt in my mind that if organized medicine had not acted in such a dastardly fashion that there would have been a long time—if ever—that the RxP movement would have had such enthusiastic support in California. The President of the Orange County Psychological Association at that time, Dr. Allison Stanley asked me to then Chair the OCPA Prescription Privilege Task Force. Needless to say, our first task was fund raising! Let’s face it, getting your legal rights in America costs money.

In my view, the RxP movement and the Hospital Practices battle are mirror images. First, we, as psychologists have to determine what is our competence. In some cases, we have to pursue additional education and training. That has been the continuing course in the RxP movement. There are now several training programs available to psychologists who want to obtain the additional education and training that ensure safe and effective prescribing.

Of course I am aware of the arguments opposing RxP for psychologists. It will not surprise you that I have found no merit in any of those arguments. This summer, I had the opportunity to attend a “debate” at the APA convention in Washington DC regarding RxP. There

were some interesting statistics, some of which addressed whether psychologists “want” RxP or it is just a minority. I thought that was a strange argument. Years ago, the same argument could be made about hospital privileges. In fact, one colleague asked me if the wisest course of action would be to just accept whatever the psychiatrists would give us, not to mention the cost of the effort (a quarter of a million dollars for just the law suit). When the issue of RxP came up, those of us on the Board of CAPP decided we should pole our members as to whether they wanted us to use our resources for the RxP effort. Over 92% of our dues paying members voted yes. It seems to me that one interpretation of the vote is that those psychologists who support advancing the profession are the ones who should direct the movement of the profession, not those who want the profession to stand still.

There was one other “argument” against RxP voiced at the “debate” that deserves comment. It is clear that there is a belief among those in the opposition to RxP who are committed to the belief that the current training programs could not possibly produce competent prescribing psychologists. It doesn’t matter what evidence one submits that the RxP folks are doing fine. The opposition is convinced that reality is that these people are not doing fine—they just can’t find that reality. To those of you who are prescribing—well done!

In 1992, I wrote: I hope that you feel a lot of pride about what your profession is accomplishing, and that you also have an understanding of what a difficult intellectual and emotional journey this has been and continues to be. I also hope you have a better understanding of some of the basic issues and events in this process.

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Minding the Mitochondria: From Cell to Psyche

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*“In nature we never see anything isolated, but
everything in connection with something else
which is before it, beside it, under it and over it.”*

Johann Wolfgang von Goethe
(1749-1832)

Abstract

This article links mitochondria and the mind. Mitochondria, our intracellular energy factories, contain a genetic blueprint, utilize nutrients, and provide metabolic fuel for neuroendocrine and immune processes that lead to health or disease. The mind constantly interacts with those processes, in a social context replete with epigenetic factors. Medications also affect the energy cycle, increasing the complexity of that biopsychosocial equation. The review of mitochondrial function focuses on stress and psychiatric disorders. Research and clinical examples demonstrate the effectiveness of mitochondrial support through nutrition with psychiatric patients. Moreover, the mind-brain-gut connection is a key factor in energy production and utilization. From this author’s perspective, the mind impacts mitochondrial function through self-regulation and mental changes generated by psychotherapy and metabolic nutrition. Psychophysiological measurements and molecular nutrition testing hold promise for assessing the mind-mitochondria links and treating their derailments. This holistic model generates hypotheses for research and evidence-based clinical work.

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Key words: **mitochondrial function, metabolic nutrition, mind-brain-gut connection, psychotherapeutic matrix**

Introduction

It takes a village to build bridges between cell and psyche... This work illuminates that path. Mitochondria are pillars of physiology and metabolism, constituting a dynamic substrate of mental and behavioral expression. While genes create road maps, nutrients fertilize the terrain and the mind cultivates it. Nutrition “feeds” the nervous system, including axonal and synaptic aspects. In the presence of vitamins, minerals and enzymes, mitochondria metabolize the brain’s main fuel, glucose, into energy intermediates needed to synthesize and release neurotransmitters. The interplay of neurotransmitters, hormones, and immune processes influences the mind. The latter is shaped by social interactions and, in turn, reshapes that interplay. Psychotropic drugs, as mind-modifying agents, affect energy metabolism as well. This monograph references research and clinical illustrations reflecting the value of mitochondrial support through nutrition with psychiatric patients. Conversely, the mind’s impact on energy metabolism is considered in relation to improved self-regulation and mental changes through holistic psychotherapy. At the close, there is a rich harvest of take-away pearls. An outline of issues for further query follows, when minding the mitochondria.

Mitochondria and their Functions

Mitochondria (fr. Greek, mito= thread; chondrion= granule) are rod-shaped, intracellular organelles labeled “powerhouses of life”¹. They are **a matter of energy**. Energy drives the brain, our main organ of behavior. Mitochondria have different shapes and serve various metabolic functions. They underlie the cascade of metabolic events that sustain the mind. Mitochondrial assessment, moreover, entails various laboratory techniques². Today’s genetic research on mitochondria is matched by renewed interest in lifestyle factors modifying gene expression, including mitochondrial function—that is epigenetics. Lifestyle includes what we think, feel, eat, our actions, relationships, environmental exposure, and socioeconomic factors. Nutrigenomics individualizes the use of nutrients, enzymes, co-factors, and diet, quieting the expression of deleterious genes³. When addressing the whole biopsychosocial matrix in psychotherapy⁴, a light shines on interventions that can improve mitochondrial function in concert with mental healing.

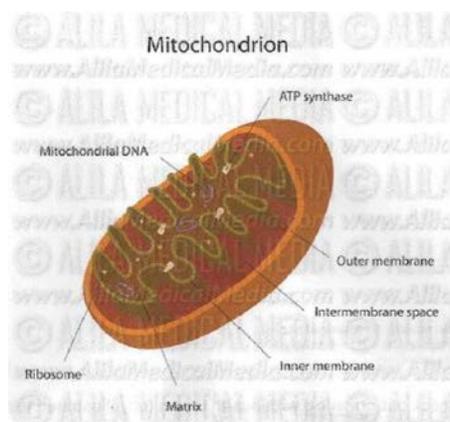


Figure 1: **Structure of a Mitochondrion**

Mitochondria originated from bacteria, most likely parasitic, which were incorporated into our cells through symbiosis at some point in evolution. These battery-like organelles influence neurotransmission, and rely heavily on nutrients. Mitochondria respond to sustained stressors and the psychophysiological states linked to them. Psychotropic drugs also impact mitochondria. Some drugs are beneficial, while others impair mitochondrial function in various body systems^{5,6}. It is a challenge to pin down the mitochondrial damage from specific medications, and minimize those effects through nutrition and/or improved pharmaceuticals. Metabolic pathway testing provides data about mitochondrial function, and guides molecular nutrition interventions. Further, various psychotherapies may help restore mitochondrial health, by promoting autonomic (ANS) balance, cognitive/ affective reframing and central nervous system (CNS) reorganization, along with lifestyle changes³. The therapist-patient relationship is an integral part of the healing equation. Psychotherapy, in synergy with metabolic nutrition, forms a foundation for renewable mitochondrial function.

Energy generation as adenosine triphosphate (ATP) is the main job of mitochondria. They manufacture 90% of the energy required for growth and to sustain life. For this purpose, a number of proteins are present in its inner membrane. ATP production entails the oxidation of major products found in the cytosol, namely, glucose, pyruvate, and NADH (reduced NAD⁺ or niacinamide dinucleotide). An electron transport chain (ETC) couples the electron transfer between a high-energy electron donor (e.g. NADH) and an electron acceptor (O₂) [i.e., oxidative phosphorylation, or OXPHOS], with the transfer of H⁺ ions (protons) across the membrane. An electrochemical proton gradient is produced, which in turn is used to generate energy as ATP via the ATP synthase complex. The cell can then utilize or store that energy as needed. The energy cycle is illustrated below:

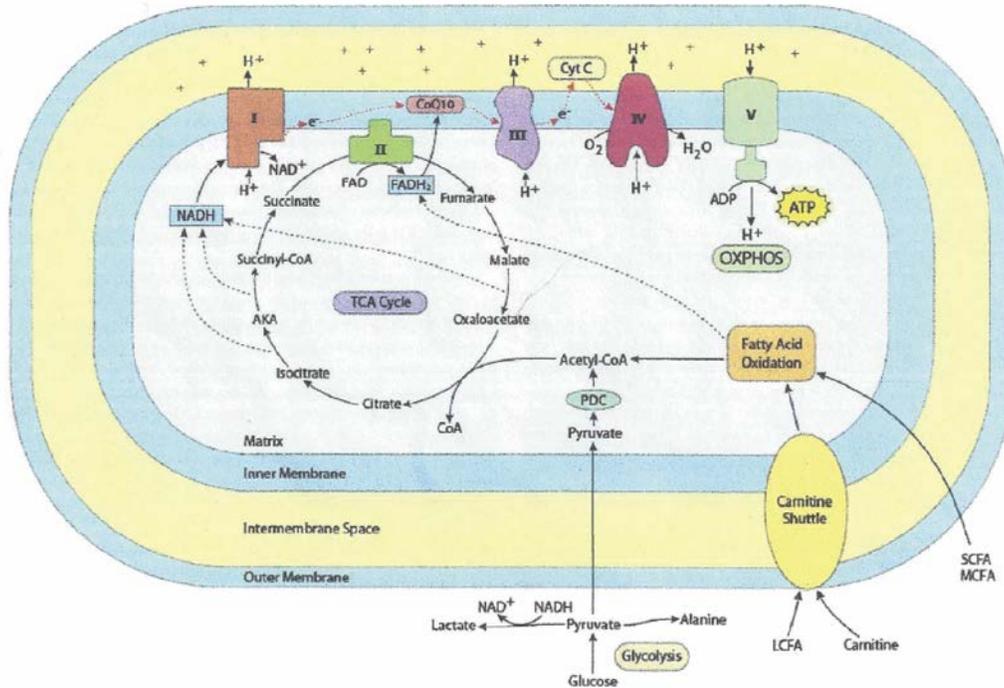


Figure 2: **Mitochondria and the Energy Cycle**
(CAC, TAC, or Krebs Cycle)

Mitochondria also participate in other metabolic functions: regulation of the membrane potential, redox signaling, regulation of free radicals, cell apoptosis and proliferation, calcium

signaling, as well as steroid synthesis. Furthermore, mitochondria play a part in cell lipid metabolism, signaling, and repair⁷. Some mitochondrial functions only take place in specific types of cells. As an illustration, liver mitochondria are equipped with enzymes to detoxify ammonia in the urea cycle, promoting total health and mental clarity.

The **concentration of mitochondria** in different organs correlates with **varying energy needs**. Being the most energy-intensive organ, the heart has the highest number of mitochondria, and the brain follows closely. The muscles, stomach, intestines, and endocrine glands (e.g; thyroid, pancreas) are highly dependent on mitochondria. There are also kidney tubules densely populated with mitochondria, while platelets and the skin have few. Although there are no mitochondria in mature red blood cells (RBC), their precursor, the proerythroblast, depends heavily on mitochondria during RBC development. A cell with fewer mitochondria is one designed for a lower energy output, unless it is dysfunctional. Mitochondrion is the only cell organelle with its own DNA (mtDNA), which is passed on through maternal genes. Some research suggested that paternal mtDNA survives in the zygote, contributing to the mtDNA pool of adult human skeletal muscle⁸. However, paternal inheritance of mtDNA is the exception¹. Mitochondria replicate through cloning, fission and fusion. Mutations or polymorphisms of mitochondrial DNA (mtDNA), mitochondria-mediated oxidative stress, reduced ATP production, and changes in intracellular calcium characterize several diseases.

Luft first described **mitochondrial disorders** in 1962⁹, as the disruption of energy metabolism in several pathways, namely:

- (1) **oxidative phosphorylation (OXPHOS);**
- (2) **fatty acid oxidation, and/or**
- (3) **the energy cycle (CAC, TCA or Krebs Cycle)**

Once mitochondria are impaired, organ and systemic effects invariably result.

Mitochondria and Neurotransmission

Throughout the nervous system, **profuse mitochondria are the hallmark of synapses**. Their **role in neurotransmission** was revealed *via* fruit fly (*Drosophila*) studies. Such work pinpointed the sub-cellular events that require mitochondria. Light microscopy showed that the synaptic terminals of axons contain a very high concentration of mitochondria, ushering the modern ultra-structural study of synapses. In the first electronic microscopy studies of the nervous system, synapses were located on the basis of mitochondria density (pre- and post-synaptic). Synapses, like other mitochondrion-rich regions of the neuron, have a high need for ATP and/or calcium buffering. Deficient ATP compromises the energy-intensive endocytosis, exocytosis, and vesicle recycling of the presynaptic region. Post synaptic mitochondria, for their part, rapidly move into dendrite areas where synaptic activity has been stimulated, as shown in studies of the fruit fly's neuromuscular junction (NMJ)¹⁰.

Neurons depend on mitochondrial function in order to establish membrane excitability, for neurotransmission, and to develop plasticity. Extensive data come from isolated mitochondria and dissociated cell cultures¹¹. In contrast, little is known about mitochondrial function within intact neurons in brain tissue. Yet, a clear description of the interactions among mitochondrial function, energy metabolism, and neuronal activity is crucial to understand neurons and their pathophysiology. New fluorescence imaging techniques, electrophysiology, and brain slice preparations examine mitochondrial function during neuronal activity, with high spatiotemporal resolution. One research group assessed mitochondrial calcium transport, membrane potential, and energy metabolism during normal neuronal activity. They also described how mitochondrial and metabolic dysfunction

develop during pathological activity, focusing on temporal lobe epilepsy as their experimental model¹².

In another study, five patients presenting a clinical **picture suggestive of neuro-transmitter defects** from early infancy on, had underlying **mitochondrial diseases**. The patients' symptoms ranged from infantile hypokinetic-rigid syndrome, to various abnormal movements, limb hypertonia, feeding difficulties, and psychomotor delays impairing learning and performance. The diagnosis was based on magnetic resonance imaging (MRI), cerebrospinal fluid (CSF), biogenic amine and pterin measurements, respiratory chain enzyme activity, and molecular assessment. In 3 out of 4 untreated patients, CSF analysis revealed low homovanillate (HVA, dopamine metabolite) and 5-hydroxyindoleacetate (5-HIAA, serotonin metabolite) in 2 of them. L-dopa therapy led to modest improvement. Those new techniques could be expanded to include mitochondrial dysfunction in mental disorders, and open therapeutic avenues¹³.

Mitochondria in Relation to Disease and Aging

Since the 1960s, there has been major progress towards understanding **mitochondria in relation to health, disease, and aging**. Mitochondrial disorders are increasingly acknowledged as a major category in clinical neurology, both in relation to altered mtDNA and coenzyme Q10 deficiency¹⁴. However, several mitochondrial diseases express themselves outside the CNS and peripheral neuromuscular system. These include the heart, endocrine system, liver, kidneys, blood, and gastrointestinal (GI) conditions¹⁵. An emerging body of knowledge links mitochondrial dysfunction to metabolic and non-metabolic abnormalities. Among those conditions are: insulin resistance, obesity, diabetes¹⁶, vascular disease, congestive heart failure, neurological and psychiatric disorders.

Mitochondrial dysfunction plays a role in all chronic diseases. It stems from various sources: decreased mitochondrial density as shown in cell cultures from **obese** donors, reduced mitochondrial efficiency due to **aging**¹⁷, and changes in mitochondrial morphology, biogenesis, or biochemical properties in **heart** diseases. Diverse conditions involving the neurological and cardiovascular systems, as well as severe mental disorders, share **two pathophysiological processes**:

- (1) **High reactive oxygen species (ROS) production**; and
- (2) **Cumulative mitochondrial DNA (mtDNA) damage**

Stress, Psychiatric Disorders and Mitochondria

This writer's focus elucidates mitochondrial dysfunction relative to **brain-mind relationships in stress and psychiatric disorders**¹⁸. Psychosocial and physical stressors contribute to many psychiatric conditions. Acute stress exposure of cultured neurons to either low or high glucocorticoid levels enhances mitochondrial function¹⁹. On the other hand, **chronic stress upregulates complex intracellular cascades**, affecting metabolic integrity and mitochondrial capacities. A keynote of stress disorders is altered activity of the hypothalamic-pituitary-adrenal (HPA) axis via upregulation of corticotropin releasing hormone (CRH) in neurons of the hypothalamic paraventricular nucleus (PVN). CRH, transported to the anterior pituitary gland stimulates the synthesis of adrenocorticotrophic hormone (ACTH). Once ACTH reaches systemic circulation, cortisol is released. Elevated glucocorticoids (e.g. cortisol) can impair mitochondrial function in post-traumatic stress disorder (PTSD)^{20, 21}. In animal studies, rats subjected to the stress of overcrowded cages, showed high inflammation and intestinal mitochondrial dysfunction, resulting in stress-related conditions such as irritable bowel syndrome (IBS)²².

High cortisol levels due to chronic stress **compromise cellular energy capacity**, in-

creasing neuronal vulnerability to toxic events by reducing the glucose available to CAC and ETC. Moreover, neurons with the highest firing rates, such as **GABAergic interneurons** (gamma-aminobutyric acid), may be deeply affected by decreased neurotransmitter release secondary to mitochondrial dysfunction²³. Sustained stress also induces **pro-inflammatory cytokines**; e.g., interleukin-1beta [IL-1beta], IL-6 & tumor necrosis factor-alpha [TNF-alpha] in the CNS and peripherally. Cytokines activate anti- and pro- apoptotic proteins of the Bcl-2 family, and can impact mitochondrial function via intracellular signaling. Further studies need to correlate precise cytokine effects on mitochondrial function with mood disorders. Any potential drug for common psychiatric disorders, also targeting mitochondria, should be first tested in a selected psychiatric population showing mitochondrial dysfunction¹⁹. Current psychotropic drugs may be treating downstream effects of more primary defects in signal transduction. Future drug therapies to alleviate anxiety and depression may be based on linking hormonal, metabolic and molecular intracellular signaling pathways^{24, 25}.

Thyroid hormones (T4 and T3) play important roles in mitochondrial function. The thyroid gland controls metabolism and closely interacts with the HPA axis. Thyroxine (T4) and the catecholamines share an amino acid substrate, namely, tyrosine (from phenylalanine). Chronic stress, with its high tyrosine requirements to form catecholamines, may leave little substrate for thyroid hormone production. T4 regulates the conversion of riboflavin (B2) to flavin adenine diphosphate (FAD), an electron carrier that is alternatively oxidized and reduced. FAD is important for mitochondrial ETC, and its disruption was implicated in autism²⁶. Decreased OXPHOS in mitochondria from hypothyroid rat liver normalized after intra-peritoneal thyroxine injection²⁷. Stress reduces the conversion of T4 to the bioactive T3 hormone. T3 (triiodothyronine) enhances mitochondrial ATP production rate in the highly oxidative tissue such as liver. Moreover, T3 stimulates oxidation and regulates antioxidant enzyme activity²⁸. T3's effects on ATP production and cell differentiation could be a major link between metabolism and development²⁹. While stress effects on the thyroid/HPA axis were not addressed in those animal studies, they are relevant to clinical practice. For hypothyroidism (even subclinical) is often seen among psychiatric patients, especially those suffering from depression.

The findings of brain mitochondrial abnormalities in individuals with neurological disorders spurred mitochondrial studies in those with psychiatric conditions. The evidence comes from electronic microscopy, imaging, gene expression, genotyping, and sequencing studies. Mitochondrial disruptions include "common deletion" and decreased gene expression in postmortem brain cells³⁰. High co-morbidity exists between conditions with impaired mitochondrial function and psychiatric disorders through decrease in neuronal plasticity, axonal transport, and neurotransmitter release³¹. Years before their neurodegenerative disorder is manifest, over 25% of those patients receive a psychiatric diagnosis. In one study, 70% of patients with mitochondrial diseases met the criteria for the following mental disorders: major depressive disorder (MDD), bipolar disorder (BD), panic disorder, and generalized anxiety disorder (GAD)¹⁹.

Mitochondrial Dysfunction in Mood Disorders, Schizophrenia, and Autism
Mitochondrial dysfunction has been associated with mood disorders, schizophrenia, and autism²⁵. Mitochondrial respiration requires the coordinated expression of two genomes with multiple subunits, a **mitochondrial genome** (mtDNA) and a **nuclear genome**. **Respiratory chain disorders** are genetically and clinically heterogeneous because of their biochemical complexity, showing up at birth or later in life. Those disorders lead to deficient ATP, and typically impact tissues with high energy requirements such as the CNS, which depends on oxidative metabolism. For example, children with mitochondrial encephalomyopathies may have learning disabilities (LD) in the areas of perception,

language, and memory. They may also show nonverbal cognitive impairment, compromised visuospatial abilities, and short-term memory deficits related to working memory, which reflect poor synaptic plasticity^{18, 24, 32}. Per recent research, children without any defined neurological condition or genetic factors may also present with learning disabilities due to mitochondrial dysfunction³³.

Mitochondrial respiration disorders significantly impact brain monoamine levels, leading to disruptions in neurotransmission dependent on serotonin, dopamine, norepinephrine, and GABA³⁴. Mitochondrial dysfunction is also associated with a decrease in brain-derived neurotrophic factor (BDNF) and hippocampal neurons, as well as disturbance of the HPA axis^{35, 36}.

Mitochondrial dysfunction is at the forefront of hypotheses seeking to explain clinical depression. Bipolar disorder (BD) was linked to diminished energy production and a shift towards anaerobic glycolysis. Such changes in energy metabolism may reduce cell plasticity and disrupt brain circuits linked to mood and cognitive control^{37, 38, 39}. Oligodendrocytes (OL) loss and malfunctions were reported in the prefrontal cortex and limbic system of patients with MDD. A certain level of functioning OLs is necessary for the dynamic control and remodeling of neuronal conduction⁴⁰. Other research showed an impairment of enzymes required for brain energy in the hippocampus of BD subjects, and upon amphetamine administration (an animal model of mania) but not in schizophrenia (SZ)⁴¹. One animal study suggested the accumulation of mtDNA deletions in neurons causing BD-like phenotypes, and further mitochondrial research was proposed as a basis to produce new mood stabilizers⁴².

Among individuals diagnosed with schizophrenia (SZ), their brains displayed abnormal mitochondrial morphology, size and density⁴³. Specific findings for the schizophrenic group included alterations of complex I (respiratory chain), reduction of complex IV, and age-dependent increase of mtDNA deletions in the frontal cortex and caudate nucleus^{25, 44}. Children with autism spectrum disorders (ASD) showed low mitochondrial enzyme function, elevated pyruvate levels, and high oxidative stress⁴⁵. In 79% of ASD cases, the etiology was not genetic but biochemical and metabolic, and included toxic exposure⁴⁶.

As a whole, the evidence from **psychiatric disorders** points to **brain mitochondrial dysfunction and dysregulated immune response; i.e., inflammation**⁴⁷. But questions remain about the varying expressions of that dysfunction, from disturbed behavior and mood [MDD] to the loss of speech [ASD], to thought disorders [SZ], or demyelination [MS]³⁹. Using the model for multiple sclerosis research⁴⁸, a common thread was proposed, linking myelin, inflammation, and mitochondrial function in BD, SZ, and MDD because of similar molecular signatures found in those psychiatric disorders. Gene-environment interactions determine the extent to which brain structures and functions are differentially impaired in individual patients. This, in turn, results in varying psychiatric symptoms and diagnoses⁴⁹.

Primary Mitochondrial Diseases and Psychiatric Disorders

Mitochondrial dysfunction, as a component of psychiatric disorders, differs from “primary mitochondrial diseases” (PMD) manifesting as psychiatric symptoms of mood disorder (depression/anxiety), cognitive decline, or psychosis. PMDs are caused by gene mutations in mtDNA or nuclear DNA, as illustrated in a review of fifty cases and one case of refractory borderline personality disorder⁵⁰. Widespread psychiatric disorders among patients with PMDs, and in those with neurodegenerative illnesses, point to the mitochondria’s role in psychiatric symptoms and their neurobiological basis. Making an accurate differential diagnosis has far-reaching implications⁵¹. Discussion of specific PMDs goes beyond this monograph.

Since a spectrum of mitochondrial disorders are evidenced, the diagnostic process calls for multi-disciplinary, clinical and laboratory evaluations. Usually, metabolic tests are performed⁵², there may also be a muscle biopsy, and in certain cases, genetic testing^{53, 54}. The proposed criteria to identify mitochondrial problems are: clinical signs and symptoms, metabolic and imaging studies, and morphology. A score of 8-12 equals mitochondrial disorders, and 5-7 suggests probable mitochondrial dysfunction⁵⁵. The mitochondrial disease criteria are precise, facilitating the differentiation between mitochondrial and other multisystem disorders. This classification helps triage the level needed for further work with patients. In children, the application of those diagnostic criteria could precede and preempt a painful muscle biopsy.

Metabolic Pathway Testing and Mitochondrial Function

It is important to clarify the links between mitochondrial dysfunction, a nonspecific risk factor, and specific symptoms of psychiatric disorders. That may help define cellular markers and design molecular nutrition interventions. Those markers could also guide the creation of psychotropic drugs capable of enhancing energy metabolism and lessening oxidative stress damage⁵⁶. In psychiatric practice, **metabolic pathway⁵⁷ testing** is increasingly used to guide therapeutic nutrition. The tests include Organic Acids from a urine sample, plasma or urinary Amino Acids, serum Lipid profiles, GI function (stool), and Toxic Exposure (blood, urine), among others. The urine **Organic Acids** profile⁵⁸ assesses **mitochondrial function through energy intermediates in central metabolic pathways**. One section of that profile may show certain elevated analytes (^), to wit:

Urinary Organic Acids Markers of Energy Cycle Dysfunction:

- ^ lactate excretion
- ^ TCA cycle intermediates, such as
 - malate
 - succinate
 - 2-oxoglutarate
 - fumarate

Other elevated metabolites are:

- ethylmalonate (from butyrate, fatty acid metabolism);
- methylmalonate (B12 metabolite)
- 3-methylglutaconate (linked to aciduria)

Alternatively, one may order a combination of tests using blood and urine samples. Specific elevations point to mitochondrial dysfunction, and provide a basis for nutritional supplementation, as follows⁵⁹:

Laboratory Test Markers Linked to Mitochondrial Dysfunction:

- Lactate (lactic acid) [^ in blood, urine, &/or CSF due to reduced pyruvate utilization by mitochondria];
- Pyruvate [lactate and pyruvate are anaerobic breakdown products of glucose]
- Lactate/pyruvate ratio [with respiratory chain defects, the blood lactate/pyruvate increases due to changes in the mitochondrial redox state]
- Carnitine [free and total]
- Acylcarnitine panel [fatty acids attached to carnitine]
- Quantitative plasma amino acids [to measure alanine and lysine]
 - May show ^ alanine, a product of transamination of pyruvate by alanine aminotransferase (ALT);

- ^ BCAA (branch chain amino acids) reflect E3 deficiency [E3= subunit of the enzyme dihydrolipoamide dehydrogenase (DLD), leading to a lactic acid buildup]
- CoQ10 (ubiquinone)
- Ammonia
- Creatine kinase (CK)
- Liver enzymes: AST (aspartate aminotransferase) & ALT
- CO2 and glucose

A complete blood screening process also includes basic chemistries, and a complete blood count (CBC).

Metabolic Nutrition for Mitochondrial Therapeutics

Current trends identify **nutrition as a major component of health maintenance and illness prevention [60]**. Most mitochondrial therapies consist of nutritional supplementation. Biochemical individuality determines the need for nutrients, and the clinical signs of nutrient insufficiency as functional deficits develop. Genetic variations affect disease expression, such as in chronic degenerative diseases⁶¹. Similarly, mitochondrial dysfunction in several individuals may respond to different nutrient combinations. While varying dysfunctions may share nutrient deficits and pathway impairments, psychosocial factors shape their idiosyncratic manifestations in a person’s health. **Biochemical and psychological individuality** produce a symptom picture requiring proper laboratory assessment and individualized treatment.

Nutritional support of mitochondrial function with supplemental nutrients, vitamins, and cofactors helps in two major ways:

- (1) **enzyme function enhancement** for more effective energy production;
- (2) **antioxidant** effects, which slow, halt, or reverse progressive mitochondrial dysfunction.

In the energy cycle (CAC), the electron transport chain (ETC) is a major source and target of reactive oxygen species (ROS). ROS are linked to free radicals producing oxidative stress, often seen in psychiatric disorders. Mitochondrial-specific superoxide dismutase (SOD), along with antioxidants such as glutathione peroxidase (GSH), protect ETC from ROS damage. Antioxidant therapies based on laboratory testing of urinary Organic Acids hold promise for treating mitochondrial dysfunction in several health conditions, including **mental disorders**⁶.

Classification of Nutrients for Mitochondrial Support

A two-tier classification of nutrients for mitochondrial support with daily oral dosages, provides broad guidelines for intervention⁶². Those supplements include vitamins, minerals, lipids, metabolites, cofactors, transporters, antioxidants, and enzyme inhibitors.

<u>Supplement</u>	<u>Dose Range</u>
	<u>First Tier:</u>
CoQ10	5-15 mg/kg
L-carnitine (Carnitor, RxP)	Variable. Start with 30 mg/kg/qd, up to 100 mg/kg
Riboflavin (B2)	100-400 mg

<u>Supplement</u>	<u>Dose Range</u>
	<u>Second Tier:</u>
Acetyl-L-Carnitine	250-1000mg
Thiamine (B1)	50-100 mg

Niacin (B3)	50-100 mg
Vitamin E	200-400 IU qd to tid
Vitamin C	100-500 mg qd to tid
Lipoic Acid (ALA)	60-200 mg tid
Selenium	25-50 mcg
b-carotene	10000 IU qod to qd
Biotin	2.5-10 mg
Folic Acid	1-10 mg

Helpful Minerals, Vitamins and Substrates:

<u>Supplement</u>	<u>Dose Range</u>
Ca, Mg, P	Variable
Succinate	6 mg
Creatine	5 gm bid after initial load (Adults)
Uridine	TBD
Citrates	Variable
Vitamin K3	5-30 mg

A review of clinical trials over the past decade, showed good results for many of the above nutrients in the treatment of mitochondrial dysfunction^{63, 64}.

Key Mitochondrial Nutrients: Carnitine, CoQ10, and ATP Co-factors (B2 and B3)

The following **mitochondrial nutrients** are examined here: carnitine, coenzyme Q10 (CoQ10), riboflavin (B2) and niacin (B3).

Carnitine is a quaternary ammonium compound (3-hydroxy-4-N-trimethylamino-butyrate). It is made endogenously from lysine and methionine, primarily within muscle, liver and the kidneys, having significant effects on mental function. Carnitine abounds in meat—from “carne”; hence, the name “carnitine”—and also dairy. Several foods of plant origin (nuts, seeds, vegetables) provide some carnitine. Skeletal muscle contains 90 % of the total body carnitine. It was originally named vitamin **BT** although it is not a vitamin.

Carnitine helps transform lipids into metabolic energy —“**burning fat for fuel.**” It transports long-chain acyl groups **from fatty acids into the mitochondrial matrix** so they can be broken down through **beta oxidation to acetyl CoA**, in order **to obtain usable energy** via CAC. Its biologically active isomer, L-carnitine, modulates the rate of fat oxidation and cell functions such as apoptosis. A carnitine deficiency impairs not only fatty acid oxidation, but also carbohydrate utilization, amino acid catabolism, and the detoxification of organic acids as well as xenobiotics.

L-carnitine was found to be effective in chronic diseases, specifically those involving the cardiovascular and endocrine systems, with controversial findings in relation to chronic renal diseases. L-carnitine and two L-carnitine esters, acetyl and propionyl L-carnitine, can improve mitochondrial function and reduce oxidative stress. Risk/benefit considerations suggest that the use of nutrients targeting mitochondria have an edge over the current pharmacological options. Future translational and clinical research can further document the ability of those nutrients to reverse pathophysiological processes⁶⁵. In neurology, L-carnitine is used in primary carnitine deficiency, to restore free carnitine levels and to remove toxic acyl compounds. Carnitine is available as a generic or brand-name prescription (Carnitor, by Sigma-Tau Pharmaceuticals) for oral or IV use in mitochondrial disease, effectively combined with other vitamins and cofactors.

L-carnitine facilitates fat utilization and liver detoxification, also improving cognition. But its use must be placed contextually, lest one encounters the over-dramatization created by a study linking L-carnitine to increased risk of atherosclerosis and cognitive impairment. On closer look, the real link was an increase in trimethylamine-N-oxide (TMAO)—a product of carnitine metabolism by certain strains of gut microbes. TMAO inhibited reverse cholesterol transport, reduced total bile acid, increased macrophage SRA, CD35 surface expression and foam cell formation. TMAO concentration, not L-carnitine, led to cardiovascular (CV) risk. Such data came from a type of mice at high risk for atherosclerosis. The original human data did not show a significant association between L-carnitine and atherosclerosis. Diets high in red meat, however, may lead to atherosclerosis through TMAO in those who have a predominance of certain intestinal bacteria—not every meat eater⁶⁶. A similar mechanism was found in relation to lecithin and phosphatidylcholine, both essential substrates for neuronal membrane integrity. The above findings illustrate a **gut-brain/mind connection**, with the gut or enteric system as a prime therapeutic target-nutritionally and psychologically.

The acetylated form of L-carnitine, **acetyl-L-carnitine (ALC)** crosses the blood-brain barrier (BBB) more effectively than carnitine. Since ALC decreases with age, it is preferred for those over forty. ALC benefits brain health and longevity⁶⁷. It has antioxidant properties, and is neuroprotective. ALC boosts the body's ability to use nerve growth factor (NGF), crucial in protecting acetylcholine-producing neurons and the hippocampus. ALC repairs neuronal membrane receptors, preserves the myelin sheath, and increases acetylcholine, improving memory and learning. Furthermore, ALC reduces damaged fat molecules such as lipofuscin in the aging brain. On the skin, lipofuscin shows up as age spots. ALC also supports the heart, protects the genetic material in sperm from free radicals, and plays a role in immune defense.

There are studies on ALC's enhancement of memory and cognition. ALC resembles the structure of acetylcholine and functions as a cholinergic neurotransmitter, having both an acetylcholine-like action and an effect on serotonergic synapses. ALC can help with age-related cognitive decline in Alzheimer's disease as well as depression^{68, 69}. Drugs cannot match ALC in minimizing aging effects or supporting brain health, since they do not have its breath of functional influences.

Co enzyme Q10 (coQ10) or ubiquinone is a natural substance in the body, assisting with **electron transfer** in the respiratory chain (ETC). It is a coenzyme for many enzymes in ATP synthesis, and has antioxidant properties. There are 10 Qs in nature, but humans only synthesize Q10. Co Q10 also comes from the diet, primarily organ meats, meat, poultry and fish. Plant foods such as nuts, soy, spinach and broccoli also have a relatively high CoQ10 contents. Vegetables, fruit, eggs, and dairy products contain modest amounts.

CoQ10 synthesis entails 17 steps and several nutrients (B2, B3, B5, B12, folic acid, C, and trace elements). Unless one eats a balanced diet and has good digestion, endogenous CoQ10 may be deficient. By middle age, CoQ10 production decreases. Supplemental CoQ10 is fat-soluble, increasingly used in the treatment of OXPHOS disorders involving the cardiovascular system (CHF, hypertension, angina, stroke), and dental conditions (gingivitis). Co Q10 links to depression were the subject of a proposed clinical study that was cancelled prior to enrollment⁷⁰.

CoQ10 is also available as ubiquinol, a formulation with purportedly higher rate of absorption. A cost-effective alternative is to use **micellized ubiquinone** for full absorption. The therapeutic doses vary widely. For ubiquinol, the range is 50-600 mg *po qd*, and

ubiquinone is given in a dose range of 50 mg all the way to 2400 mg *po bid* or *tid* for certain neurological degenerative disorders. A fat-soluble vitamin, CoQ10 is taken with meals. There are no known toxicities or side effects. Adverse effects include wakefulness and sleep disruption. Certain medications interfere with CoQ production, namely, beta blockers and HMG-CoA reductase inhibitors (statins), tricyclic antidepressants, phenothiazines, and butyrophenone, among others. For the older patients on anticoagulants, CoQ10 might reduce warfarin concentration. On the other side, CoQ10 reduces the effects of chemotherapy toxicity, of HIV drugs known to cause mitochondrial dysfunction, and certain psychotropic drugs³.

The writer's experience with CoQ10 ranged from moderately positive to outstanding. Cases included integrative therapies for various mental disorders (bipolar disorder, learning disabilities, MDD, ADHD). CoQ10 also provided valuable adjunctive support in statin-treated cases of hypercholesterolemia (to offset CoQ10 depleting effects), neurological disorders (multiple sclerosis, MS), and cardiovascular conditions. Some examples of remarkable responses were two cases of bipolar disorder (males, ages 53 and 14), an adolescent with attention deficit hyperactivity disorder combined with anxiety and Tourette's (male, age 13), one child with severe learning disabilities (male, age 8), and two individuals with MS and depression (females, ages 22 and 26). The clinical responses of most patients showing a need for CoQ supplementation—per lab tests—involved the resolution of fatigue, improved mood, positive activation, and sharper cognitive functioning. The usual dose range used was a 100 mg daily oral dose (*po qd*) in children and up to 300 mg in adolescents and adults. While the literature refers to daily CoQ10 doses of 50 mg or more, its systematic use in mental disorders warrants further study.

Other nutrients that help improve mitochondrial function are riboflavin (**B2**) and the **niacinamide form of B3**, both ATP cofactors as flavins and nicotinic adenine dinucleotide (NAD), respectively. The dose range is 50-400 mg *po qd*. However, the writer favors remaining on the lower end unless otherwise indicated, and using food-derived, organic nutraceuticals whenever possible. B2 and B3 along with iodine are also very helpful adjuncts in certain cases of hypothyroidism.

B2 is an isoalloxazine. Its derived coenzymes are flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD). Powerful alkalis and light easily destroy B2, while psyllium gum, alcohol, and antacids slow down its absorption. Food and bile salts facilitate B2 assimilation. The bioavailability of B2 is affected by certain substances that bind it, namely, copper, zinc, caffeine, theophylline, saccharin, B3, C, and tryptophan. Major food sources of B2 are organ meats, brewer's yeast, almonds, mushrooms, and wheat germ, with egg yolks, wild rice, and many other foods containing small amounts.

For **B2** or **riboflavin**, the dose range is 50-400 mg *po qd*. High doses may cause anorexia and nausea. One of the writer's patients suffering chronically from major depressive disorder (MDD) and narcolepsy, benefited from a derivative of B2, **D-ribose** — a five-carbon sugar (C₅H₁₀O₅). D-ribose has been used to improve sports performance by enhancing muscle energy, and in chronic fatigue syndrome (CFS), fibromyalgia, and to prevent cramps, pain and stiffness in an inherited disorder involving AMP (adenosine monophosphate) deaminase deficiency. In coronary heart disease (CAD), D-ribose is used as an intravenous (IV) application in diagnostic procedures that measure the extent of damaged heart muscle, and orally, as a beneficial supplement since it supports the heart's energy production⁷¹. B2 is also used for nerve damage.

B3 is commonly known as **niacin** (nicotinic acid, vitamin PP or pellagra-preventive). Niacin is utilized to create the active cofactors nicotinic adenine dinucleotide (NADH⁺) and its

phosphorylated form (NADPH). B3 is discussed in detail because of the ground-breaking work by Hoffer with severe mental disorders⁷². As the seminal ortho-molecular psychiatrist, he reported therapeutic responses from megadoses of B3 in the schizophrenias and major affective disorders^{73, 74}. The best food sources are beets, brewer's yeast, beef liver and kidney, fish, salmon, tuna, and sunflower seeds, among others. Moreover, B3 can be obtained from tryptophan containing foods, such as fowl, red meat, eggs, and dairy. Exogenously, daily oral doses above 50 mg can cause a "flush" (tingling, burning in face and chest, redness) that can be relieved by aspirin 30 minutes prior to niacin intake. Other problems with niacin are that, at the high doses required to lower cholesterol, it causes ulcers, glucose regulation problems, and elevated liver enzymes in some individuals.

A derivative of B3 without its side effects is **inositol hexanicotinate (IHN)**, made of B3 and inositol. In the body, inositol nicotinate releases a form of niacin, which causes vasodilation, lowers blood lipids such as LDL, and breaks up a protein needed for blood clotting. **IHN applications** include hypercholesterolemia, hypertension, insomnia, migraines secondary to atherosclerosis, some autoimmune skin conditions (scleroderma, dermatitis, psoriasis), exfoliative glossitis involving tongue inflammation, restless leg syndrome, diabetes type 1 (facilitates decrease in insulin requirement), and several mental disorders including schizophrenia. In England, IHN is used even in conventional medical practice for various circulatory problems; e.g. intermittent claudication (legs), Raynaud's disease (cold fingers & toes), and cerebrovascular disease (CVD). The writer's experience includes insomnia, fatigue, elevated blood lipids, and mental disorders. Currently, no systematic research exists with IHN. It is often recommended to supplement the whole B complex, along with active metabolites of specific B's as needed.

Other Mitochondrial Nutrients

Other nutrients are equally critical to improve the mitochondria and enhance mental functioning, by uplifting brain energetics on a cellular level. They are: **alpha-lipoic acid** (a glutathione precursor, preferably the R-isomer), **NAC** (N-acetyl-cysteine)⁷⁵, **B vitamin complex** (from food sources, gut bacteria, and probiotics), **vitamin C** (buffered ascorbate), **E** (mixed tocopherols), **L-arginine** and **L-creatine**. For example, creatine showed promise as an augmentation therapy in conjunction with antidepressants for MDD^{75a}. Nutrients act synergistically, and so do their therapeutic effects. Vitamin combinations including CoQ10 and B vitamins are used in a "mitochondrial treatment cocktail." Similarly, the Meyers cocktail is an intravenous (IV) application of B complex and other cofactors (e.g. Mg) that can energize the whole person.

Botanicals with Beneficial Effects on Mitochondria

Several botanicals are associated with enhanced mitochondrial function. They have anti-inflammatory and monoamine oxidase inhibiting (MAOI) effects as well. Curcumin, a polyphenol extracted from ***Curcuma longa*** (turmeric), improves motor and cognitive performance. It reduces oxidative damage, plaque build-up and has cholinergic effects. Curcumin may also act as an antidepressant. One randomized study of sixty subjects with MDD reported the administration of 20 mg fluoxetine *po qd* and 1000 mg curcumin, individually or in combination. After six weeks, the mean change in Hamilton Depression score (HAM-D) was comparable in all three groups^{75b}.

Hypericum perforatum L. (St. John's Wort, or SJW), is a well-researched and widely used herb in the United States. Hyperforin in SJW is an effective antidepressant in varying doses. It fosters maturation of oligodendrocytes (OL) and prevents mitochondrial toxin-induced toxicity⁷⁶. SJW use must take into account an individual's medication regimen because of herb-drug interactions, specifically hyperforin's induction of CYP3A4 enzymes^{76a}.

Rhodiola rosea is also called “golden root” and “crenulin.” In animal studies, it increased ATP and creatine phosphate (CP) in the brain and muscle mitochondria of mice going through a forced swim test. In a human trial, Rhodiola (3% rosavins) improved several measures of mental performance: associative thinking, short-term memory, concentration, calculation, and speed of audiovisual perception. Rhodiola may also enhance ammonia re-assimilation and energy metabolism through increased ATP, RNA, protein, and amino acid synthesis. An open clinical trial showed antidepressant properties in 65% of patients⁷⁷. Rhodiola has dose-dependent effects: stimulating in low doses and calming in high ones.

Schisandra sinensis berry protects mitochondria, which helps explain its mental and physical energy-invigorating effects^{78, 79}. Schisandra relieves exhaustion, and is hepatoprotective. Its Chinese name, **wu-wei-zi** means “herb of five tastes.” Schisandra stimulates the sweet, sour, salty, bitter, and pungent receptors of the tongue which, in turn, produce stimulation of the body’s organs and systems. The usual recommended dose is 100-500 mg *po qd*. Different levels of evidence favor the use of the above nutrients and botanicals for brain mitochondria⁸⁰, and to smooth the drug-tapering process. Both Rhodiola and Schisandra are known adaptogens.

Pharmaceutical Interventions for Neuronal Mitochondria: Animal Models

Animal models and behavioral paradigms (e.g. motor coordination, learning, memory nociception, learned helplessness) enable researchers to assess the impact of pharmacological and nutritional interventions on mitochondria. In “learned helplessness” experiments with mice, certain antidepressants such as nortriptyline, lithium, and sertraline had neuroprotective effects. For neurodegenerative disorders, lithium rescued spinal cord mitochondria but may not have reversed motor neuron damage. Nortriptyline, a tricyclic antidepressant, slowed down degenerative processes but showed accumulated toxicity upon several months of administration.

Sertraline was thought to protect against oxidative damage and neuronal death from nitrogenous free radicals. Furthermore, fluoxetine and amitriptyline were found to increase glycogenolysis and ATP production in astrocytes *in vitro*^{81, 82}. An activation of the inflammatory response system characterizes depression. Antidepressants may have negative immunoregulatory effects. For example, sertraline inhibits a Th1-like pro-inflammatory cytokine (interferon-gamma or IFN-gamma) while boosting a Th2-like anti-inflammatory cytokine (interleukin or IL-10)⁸³. Yet the precise effects from selective serotonin reuptake inhibitors (SSRIs) on mitochondrial function remain unclear. Selegiline, a monoamine oxidase inhibitor-B (MAOI-B), improved motor performance and enhanced dopamine along with its metabolites⁸⁴.

Melatonin (N-acetyl-5-methoxytryptamine), an endogenous antioxidant, comes as an OTC (over the counter) supplement or can be obtained as a prescription drug, ramelteon (M1 and M 2 receptor agonist). It was found to slow neuronal senescence⁸⁵ by lessening oxidative stress and neuronal apoptosis—the latter being linked to mitochondrial function. Melatonin possibly augments SOD activity and inhibits lipid peroxidation⁸⁶. Centrophe-noxine (meclofenoxate), an antioxidant and off-label nootropic, is used in senile dementia and Alzheimer’s disease. It is made up of an ester of dimethyl-ethanolamine (DMAE) and 4-chlorophenoxyacetic acid (pCPA). It improved mice’s motor function and enhanced dopamine. It is thought to work by stimulating glucose uptake and oxygen utilization, which increase the brain’s energy metabolism⁸⁴. Centrophe-noxine should be avoided by individuals with severe hypertension and seizures.

Medication-Induced Mitochondrial Dysfunction

Medications present a double-edged sword when benefits are pitted against side effects

and metabolic disruptions. On one hand, an important source of mitochondrial dysfunction is made up of **medications with reported mitochondrial toxicity**. Among them are: acetaminophen, antiretrovirals, statins, aspirin, aminoglycoside antibiotics, erythromycin, aminoglycoside chemotherapeutics, metformin, beta-blockers, steroids, valproic acid (VPA) and several psychotropic drugs^{3, 87, 87a}. On the other hand, the mood stabilizing agents lithium and VPA increase CNS levels of the neuroprotective protein Bcl-2⁸⁸. Whenever psychiatric patients show symptoms of mitochondrial dysfunction (fatigue, muscle issues, poor memory, etc), it is wise to review their history and inquire about their drug regimens. Consultation with a neurologist is indicated, in addition to a thorough physical examination. Mitochondrial disorders have multisystem manifestations¹⁵.

Case reports of **psychiatric aggravation triggered by neuroleptics** illustrate the need for caution before prescribing. In one instance, an adolescent girl with mitochondrial disorder and depression developed new-onset psychosis and deteriorated mood with risperidone (Risperdal, 0.5 mg *po bid*) used to address impulsivity. She also started paroxetine (Paxil, 10 mg *po qd*) for depression. Within two days of risperidone discontinuation, she was free of psychotic symptoms, fatigue, psychomotor retardation, and her seizures decreased to one or two per year. She continued with the antidepressant. Marked improvement in the girl's condition, including depression, was attributed to her taking a "mitochondrial nutrition cocktail" with carnitine (Rx Carnitor) and CoQ10. There is empirical support for supplements and enzyme cofactors (CoQ10, B complex, K), amino acids (carnitine), individualized diet, and a "vitamin cocktail" rich in antioxidants⁸⁹.

In vitro data showed both **typical and atypical neuroleptics to inhibit mitochondrial OXPHOS [90]**. Other studies disclosed that certain neuroleptic medications (haloperidol, chlorpromazine, and thiothixene) inhibit ETC complex I enzyme activity in both rat [91] and human brain (haloperidol, chlorpromazine, risperidone and, to a lesser extent, clozapine)⁹². Hence, those neuroleptics may exacerbate the psychiatric symptoms they are intended to treat. Neuroleptics with the least amount of mitochondrial dysfunction are olanzapine, and clozapine, followed by quetiapine⁹⁰. On the other hand, these agents raise the risk of metabolic syndrome, which also inhibits mitochondrial function. In addition, clozapine may produce agranulocytosis and, as a result, infections due to immunosuppression. Lack of downregulation of mitochondrial genes in the brains of individuals with schizophrenia may result from the administration of antipsychotics. OXPHOS inhibition and ETC reduction may help account for the high incidence of relapse when patients stop those medications^{91, 41}.

Several intervening factors may help explain the contradictory findings, namely, the timing, duration, and amount of drug, along with other concurrently administered drugs. Moreover, tobacco and alcohol use, along with calorie intake are all variables impacting cellular respiration (OXPHOS). Those factors could also interact with the antipsychotics and mood stabilizers, augmenting their noxious effects⁹³. Mitochondrial dysfunction, especially in the mtDNA, interferes with higher-level functions in the brain due to its considerable energy demands⁹⁴. Environmental toxins also dampen mitochondrial activity. These include Bisphenol-A (BPA) used in plastics, epoxy resins, metal cans liners, cash register receipts, and food storage containers. Moreover, there are persistent organic pollutants (POPs). All those toxins may impair pancreatic beta cells, the liver and, ultimately, the brain. Air pollution and heavy metals can directly impact CNS mitochondria.

One research group systematically reviewed the positive and negative effects of several psychotropic classes (antidepressants, mood stabilizers, and antipsychotics) on different aspects of mitochondrial function⁵. While the intent of pharmacological therapies is to alleviate suffering, they may do so at a systemic price; e.g., nutrient depletions, and the

blockage of pathways involved in energy generation and metabolism. This creates a vicious cycle of symptom formation. One way to neutralize the deleterious side effects of psychotropic drugs on mitochondrial function is to use the nutrients referenced above. Knowledge of drug-drug interactions and drug-nutrient interactions can also lead to selective prescribing and individualized supplementation. These interventions, in turn, enhance patients' response to medication, and their long-term health.

Gastrointestinal Health and Mitochondria

Mitochondrial dysfunction interacts with digestion and GI health, increasingly recognized as a central source of physical and mental disorders. The enteric nervous system (ENS) and the enteric endocrine system (EES) mirror neurotransmitters and hormones in the CNS. Moreover, the GI tract contains the enteric immune system (EIS), making up about 70% of the body's immunity. The friendly gut bacteria produce B complex vitamins, which are co-factors of the energy cycle. Various diseases are being linked to the prevalent strains of intestinal microflora; e.g., type 1 diabetes, leanness versus obesity (bacteroidetes vs firmicutes), hypothyroidism (Yersenia), arthritis (Klebsiella), asthma, and allergies⁵⁸.

Mitochondrial function affects the gut-brain connection [95]. First, ATP is required to carry nutrients such as 5-methyltetrahydrofolate (5MTHF, active metabolite of folic acid) into the brain. This process is disrupted by autoantibody proliferation upon consumption of certain foods (e.g., gluten, cow's milk) in sensitive individuals. A neurotransmitter cofactor, 5MTHF is also used as an augmentation agent in antidepressant therapy. Secondly, mitochondria assist with the detoxification of toxins from GI bacteria that may impair the brain. Because of the high energy requirements in GI tract and cerebrovascular endothelium, mitochondrial dysfunction may be implicated in barrier dysfunction, both in the gut and the brain⁹⁶.

Studies exist, indicating that **intestinal dysbiosis influences brain function**. GI clostridia (anaerobic, spore-forming Gram-positive rod bacteria) and other autism-associated bacteria (bacteroidetes, desulfovibrio) generate the short-chain fatty acid (SCFA) propionic acid (PPA or propanoic acid) via fermentation. PPA, in turn, inhibits mitochondrial fatty acid metabolism and function, also stimulating neuroinflammation⁹⁷. Carnitine-dependent pathways are thus affected⁹⁸. A PPA product appears elevated in the urine of patients with ASD and schizophrenia. Studies of autistic children correlate the treatment of GI clostridia with improved social interaction, eye contact, and vocalization. Furthermore, carnitine may reduce propionic acid toxicity and benefit the gut-brain connection⁹⁹.

Another illustration of gut-brain disruption is **excessive ammonia from certain GI bacteria or incompletely digested proteins**. It produces neuropsychological dysfunction when the liver fails to work properly since liver mitochondria detoxify ammonia. From the drug front, recent evidence links olanzapine to the proliferation of firmicutes, a type of bacteria that causes the gut to extract more calories from food and thus gain weight. Despite the weight loss in rats upon antibiotic administration, the authors cautioned about potential antibiotic resistance¹⁰⁰. Such treatment also raises concerns about eliminating beneficial gut bacteria that make B vitamins—a key group for CAC as well as being co-factors in neurotransmitter and CoQ10 production.

The Mind-Brain-Gut/Energy Connection

Enter the mind into the gut-brain equation:

The novel field of **enteric psychiatry** invites us to look into the **mind-brain-gut connection**, “**that gut feeling**,” in the process of energy release through the mitochondria. Research **suggests bidirectional effects**: mood and feelings affect the gut's flora and, conversely, gut microbiota influence mental states^{101, 102, 103}. A recent study of healthy

women, linked the ingestion of a fermented milk product with probiotic (FMPP) for 4 weeks to positive changes in brain connectivity and responses to emotional attention tasks¹⁰⁴. This writer observed dramatic changes in energy expression among patients with mental and physical co-morbidities, from mood disorders, ASD, learning disabilities, neurological diseases, and adrenal insufficiency, to GI disorders such as irritable bowel syndrome (IBS), colitis, and intestinal permeability by using a foundational nutrition regime in tandem with psychotherapy. Having thus restored the mind-brain-gut connection, digestive competence also improved. In that context, mitochondrial support enhanced mental/emotional functioning and benefited the coordination of several body systems³.

The gut has been labeled “the second brain”¹⁰⁵. Eastern cultures posit the **abdomen and its organs, as the center of energy** or vital force: “Hara” (Japan), “Manipura chakra” (India’s yogic tradition), “Dan tien” (Chinese medicine). Those traditions also offer meditative methods for harnessing the mind’s power to regulate, channel, and optimize energy emanating from that core—a mind-brain-gut connection. One Western attempt to integrate the gut’s immune system with the body’s energy regulators—neuroendocrine system—is the concept of a Neuroendocrine Immune Supersystem (NEI)¹⁰⁶. This writer proposes a further step. Since the mind constantly interacts with NEI, the notion of a “Psycho-NEI” (PNEI) system would best unite matter and energy patterns in holistic assessment and treatment.

One case of mitochondrial disease mistaken for depression and somatoform conversions attracted significant media attention over the last couple of years. A twelve year-old girl, was so diagnosed by a psychologist who did not link the fatigue and lack of motivation to a disorder of energy metabolism. A cascade of unfortunate psychosocial developments ensued, let alone neglect of the girl’s primary medical diagnosis. The review of individual and family history contained useful leads since the girl’s sisters were being treated for mitochondrial disorders¹⁰⁷. This case highlights the need to travel back and forth from cell to psyche, in order to offer patients appropriate treatment options. Even when psychotherapy and psychosocial interventions are indicated, understanding the biological root causes of an individual’s imbalances and how they interact with their mental dilemmas, is essential for responsible and effective patient care.

A Holistic Psychotherapeutic Matrix for Mitochondrial Support

At present, energy-based therapies are gaining ascendancy as alternative health approaches. These include acupuncture, homeopathy, yoga therapy, massage, and other kinds of bodywork, including spinal manipulations¹⁰⁸. The investigation of how those therapies may influence mitochondrial function is timely. It is proposed here that the psychotherapeutic matrix also enhances and re-orientes energy. The “talking cure” has multilevel implications. In neuroimaging studies (fMRI), psychological parameters such as suggestion and expectation were found to modulate biological processes^{109, 110}. Neuroscientists found that long-term change from psychotherapy correlates with functional and anatomical changes in the brain¹¹¹. There is also evidence suggesting that psychotherapy influences pathological processes through the modulation of specific neurochemical mechanisms¹¹². Brain plasticity, which underlies the capacity for growth, recovery, and change, depends on mitochondrial function, among other factors.

Despite advances in core neuroscience, there exist major gaps between the knowledge of neuronal plasticity and our understanding of the mind’s energy shifts. Furthermore, the interpersonal dimension is crucial since mental processes thrive or are stymied within social and cultural contexts. Psychotherapeutic communication illustrates a live energy exchange between patient and therapist with reciprocal effects. Word choices, voice inflection, tone,

facial and bodily gestures carry with them energy patterns that modify the interlocutors. One can measure those effects with psychophysiological instruments^{111, 113, 114, 115}.

Biofeedback-assisted psychotherapy fosters the patient's body-mind awareness through monitoring and training respiration, heart rate variability (HRV), and other autonomic functions, plus CNS functions through brain wave feedback (neurofeedback). These methods, along with autogenics, yoga, meditation, tai chi, and hypnosis are profound catalysts of energy transformation linked to mental health improvements and physical recovery. State of the art technology such as QEEG (Quantitative Electroencephalogram)¹¹⁶, assessing brain energy at work, provides tools for building an evidence base of the "mind-mitochondria" connection. Extrapolations and empirical links can create super highways between cell and psyche.

Research in applied psychophysiology and biofeedback has generated abundant evidence about the mind's power to regulate body functions, especially in mitochondria-dependent organs such as the heart and the brain. ECG-EEG links were also established in relation to interpersonal factors. One longitudinal study found that the registration of cardiac energy between individuals may be enhanced in those who are more receptive to that information. When the experimenter's ECG was used as the trigger, significant evidence of his ECG was found in the subject's EEG (chiefly in the anterior regions) among individuals who viewed themselves in college as having been raised by loving parents. They also became healthier as adults than the subjects who were in the "low loving" group¹¹⁷. It would be interesting to study those ECG-EEG links among veterans suffering from PTSD.

Until recently, it seemed inconceivable to modify energy-rich functions such as blood pressure, brain alertness, or temperature through mind-directed methods¹¹⁸. Yet Eastern cultures have an age-old tradition of so doing. In a meditative state, Tibetan monks melted ice over their coats. A conscious mental focus can increase thermogenesis, which has mitochondrial input. In another instance, Buddhist monks practicing Vipassana (mindfulness meditation) showed optimal energy patterns on their EEGs¹¹⁹. One psychologist-gastroenterologist team proved hypnosis to be effective with Irritable Bowel Syndrome (IBS)¹²⁰. These examples demonstrate the value of mind-based methods to support mind-brain function, and mind-brain-gut connections. By enlisting the parasympathetic nervous system (PNS), those methods improve vagal signals in a context of safety (not fear or threat)¹¹⁴, modifying physiology, energy metabolism, and mental state.

From another perspective, a recent study tested the impact of glucose levels upon aggression in married couples. Glucose stemming from food intake turns into ATP, part of which contributes to brain energy. Studies show that a hypoglycemic state interferes with concentration and emotional self-control, raising the likelihood of increased irritability and spousal abuse. Low glucose levels were found to be a factor in intimate partner violence. Interventions providing individuals stable access to nutrient-dense food, are critical in stress-laden settings conducive to aggression, namely, prisons, psychiatric hospitals, and schools. Moreover, two high risk populations are dieters and diabetics. Looking ahead, the authors proposed research on glucose tolerance (how effectively glucose is broken down to produce energy) as a modulator of emotions. Since self-control requires a well-nourished, energetic brain, healthy glucose metabolism may support marital harmony¹²¹.

Psychophysilogic-metabolic approaches transcend the Cartesian mind-body split, which set man *apart from* nature for centuries. Contemporary science and practice redefine man as *a part of nature*. They bring new insights into the whole person, also delving inside the power generators of the cell, i.e., the mitochondria. The human healing process restores

body-mind connections, and our mental faculties play a critical role. Through different levels of attention, we perceive, learn, and grow—or regress—as we process whatever comes in through our senses. The awareness-energy connection is our ultimate experiential reality¹¹³. The mind, our “ruling sense,” dynamically watches the body reacting to the environment through neuroception¹¹⁴. Yoga therapy (chikitsa) entails “moving” energy along the channels (chakras and nadis) and “removing” or releasing energy blocks. Movement sequences and breath with focused attention foster inner balance and improved health. Psychotherapeutic communication between therapist and patient also entails profound energy changes^{112, 115}. It behooves us to know the process of energy production and release, and how its derailment impairs mental functions. At full circle, cell and psyche coalesce in a dynamic integration of matter and energy.

A reductionist model spotlights the genetic and biochemical bases of normal mitochondrial function. While those are important pieces of the big puzzle, the literature discloses uncertainty and incomplete answers. Moreover, epigenetic influences can encourage, alter, or mute gene expression. Hence, the profound effects of stress, negative emotions and thought patterns, disturbed bonds^{122, 123}, violence, loss, grief, and nutrient deficiencies, especially when chronic, become prime targets to assess and heal the mind-brain/body connections energetically. Moreover, environmental toxicants and pollutants can modify that equation, and their impact on an individual’s health needs to be assessed.

Integrated functional knowledge where psychology, physiology, and nutrition meet, promotes collaboration with the specialists focusing on genes at the roots of complex molecules and metabolism. Medical psychologists thus informed can become active participants in the dialogue about mitochondria and the treatment process. They may utilize molecular nutrition and drugs as part of the treatment plan, with psychotherapeutic and experiential methods at the center. Further reflections on ways to support effectively the expression of our patients’ cellular energy for enhanced plasticity are beyond the scope of this paper, but merit future study. This is fertile ground for clinical interventions and research.

Closing Remarks and Future Directions Ideas for a Biopsychosocial/Energy-Oriented Practice

Takeaway points from the preceding discussion are referenced below:

- 1) Metabolic nutrition, guided by molecular laboratory tests, offers safe and effective support for mitochondrial function within the psychotherapeutic matrix;
- 2) Nutrigenomics goes beyond nutritional supplements. A healthy diet and digestive competence (NEI GI function), along with mental balance are also necessary for proper nutrient utilization and metabolism—a gut-mind connection (PNEI);
- 3) Holistic psychotherapy draws upon the patient’s total communication, also entailin psychophysiological and nutritional assessment. As individuals reweave the strands of their lives, reframe old imprints, and build a sense of inner safety, their mode of experiencing changes. So does the mind interact with physiology and transformative cell metabolism;
- 4) Psychotropic drugs, now aiming to modulate neurotransmitter expression, address problems that may be secondary to basic metabolic processes in mitochondria. Novel approaches targeting mitochondria may yield pharmaceuticals that protect and enhance energy metabolism, rather than inhibiting it;
- 5) Medical psychologists are encouraged to add metabolic nutrition testing to their diagnostic tools, specialty nutrition to their somatic interventions (i.e. pharmacotherapy), and basic psychophysiological monitoring during sessions. In the context of collaboration with the patient’s primary care physician [PCP] or other specialists as appropriate, those modalities can lead to best clinical practices;

- 6) Detailed records of clinical observations can generate objective measures to test the mind-mitochondria connection within the psychotherapeutic matrix.

Linking Mitochondria and Psyche: What is Next?

Future steps to bridge mitochondria and psyche may yield:

- 1) Selected measures of mitochondrial function in relation to the psychological factors (e.g. personality, mood states, thought patterns) affecting NEI—that is PNEI;
- 2) Guidelines for mitochondrial support through metabolic nutrition (diet, supplements, digestive restoration) for enhanced mental and behavioral care;
- 3) Assessment of mitochondrial function changes from combined treatments that include psychotherapy along with somatic modalities (nutrition, psychotropic drugs);
- 4) Descriptions of the specific benefits from psychophysiological assessment and therapies among the interventions used to improve mitochondrial function;
- 5) QEEG data reflecting patterns of cognition, motor performance, mood states, and communication, which may correlate with pre- and post-psychotherapy mitochondrial function;
- 6) Individualized psychotherapeutic care, combining psychosocial and physiologic/metabolic methods, with the mind as key player.

Epilogue—Minding the Mitochondria: the Chinese Way

Over the last century, Western medicine has struggled to create a viable paradigm. The mind, a key factor in the complexities of disease expression, requires the consideration of energy. Mitochondrial models have the potential of integrating structure and energy, whose balanced interaction promotes health. The mitochondrion evolved from being a pro-teobacterium to becoming an “energy plant,” while the nucleus-cytosol became specialized in structure. Such design propelled the development of higher life forms, all the way to the human species¹²⁴. It is noteworthy that certain Asian herbal preparations were found to modulate mitochondrial energy along with tissue-specific structural functions¹²⁵. In such paradigm, matter and energy merge to help restore body-mind health.

A Chinese saying eloquently captures the mind’s oversight of energy, watching over the intricate communication networks in the body:

YEN GWAN BI	(Eyes watch nose)	[liver meridian à lung]
BI GWAN SHIN	(Nose watches heart)	[lung meridian à heart]
SHIN GWAN SHEN	(Heart watches mind)	[heart meridian (feelings)à mind]
SHEN GWAN CHI	(Mind watches energy)	[mind à governing vessel/energy]

To follow that,

CHI YU DAN TIEN (Energy develops and is stored in the gut)
[energy/conception vessel]

The conception vessel and the governing vessel, respectively, rule the *ying and yang* principles harmonizing the whole energy system.

In conclusion, it is a long journey from cell to psyche, with the “gut feeling” as a major relay station. To flow with enteric musings, the above ideas are food for thought and assimilation, before the next burst of energy...

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An Outdated Health Care System: Problems, Barriers, Blockades and Solutions

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Some have traced Medical Psychology to 1945 and Karl Heiser and the Connecticut Psychology licensure law¹. I hold the Karl Heiser award given for national psychology advocacy, and revere him and the award, but he was not the father of Medical Psychology. To think that is an error and the sanitized American Psychological Association (APA) version. Medical psychology started with a neurologist turned psychologist (Freud) and other physicians turned psychologists (the Vienna Group) in the late 1800s. These physicians left medicine and the medical science training because there was more to health, brain development and repair, and relational and social life than a biomechanic construction. Freud, a neurologist, came to view the brain as a marvelous but autoplasmic mechanism which could change by contrived and special experience. He became aware of methods to energize sections of the brain so that they could effect reorganization, inhibition, and more sophisticated expression. By 1916, shortly after Freud made his famous trip to the USA and the renowned psychological speeches, a physician by the name of Lydia Ross published a paper entitled "Medical Psychology" in which she warned against becoming so dominated by man's "animal nature" (physical) that the Medical Psychologist loses the capacity to integrate the physical, psychological, social, and life-style aspects of disease². More recently the specialty of Medical Psychology (www.amphome.org), and the American College of Life-style Medicine (ACLM, see, <http://www.lifestylemedicine.org/>) have led these aged conceptualizations of health and positive and integrative approaches into the twenty-first century! Increasingly physicians in the ACLM (membership is physicians and psychologists) are given continuing education on behavioral and cognitive interventions, nutrition, relational and stress management, substance abuse treatment, and other contextual aspects of controlling and preventing physician and psychological disease. They are following in the perception of Freud and the Vienna Group and leaving the body medicine and becoming much more psychologist in their orientation.

Recently, the US healthcare system has been weighed in the balance and found wanting and overly biomechanistic³. The Patient Protection and Affordable Care Act (ACA) has attempted to address this problem by moving us back to a more holistic and integrated care system of healthcare⁴. The modern healthcare team will consist of a psychologist and physicians and nurse practitioners, nurses, and bachelors level psychology and social work case managers and health educators. This is contrary to the traditional medical model mindset which views all health and healthcare from a simple bio-reduction or biomechanical philosophy. Still, the realities of the current body of research evidence, long-term migration of many of the more insightful and educated physicians, and the scientific community point to a multi-dimensional and multi-pathway etiology of most serious diseases.

We now know that habit patterns and chronic behaviors, attitudes, stressors and their management, and lifestyle and recreational patterns are involved in the cause of most serious disease. Ornish and colleagues began to shock the bio-reductionists by reversing aspects of heart disease with life-style psychology⁵. Boll and colleagues later made it clear that early medicine was "mostly psychological" and that it only recently became so allopathic,

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surgical, and dominated by medications⁶. Cummings, by 1968 was practicing medical psychology and proving that it was a clinical, programmatic, and economic success⁷. The science is now available that these psychological factors and Medical Psychology are just as important in the etiology and treatment and management of the major and most costly diseases as the biology of the person⁸! We also know more about the cost/benefit of palliative and allopathic interventions and that there is “no free lunch” (short-term and symptom solutions cost dramatically more in the long run)⁹.

The United States Healthcare System is Flawed

The four major factors negatively affecting health in the USA are: 1. The over prescription, mis-prescription, and misuse of medications, 2. Sedentary life-style and lack of proper exercise, nutrition, and outdoor activity, 3. Poor stress management, and 4. Immaturity/mental illness and related choices that effect 1-3 above). Unfortunately, the current Medical Industrial Complex is set up to capitalize upon these 4 factors rather than correct them. Primary care medicine and primary care physicians (the future leaders of the emerging Affordable Care Act system) have abdicated their leadership role in “growth and curative interventions” and have opted for alliances with the pharmaceutical houses, hospital chains and corporations to provide economically rewarding, overly simplistic, and short-term effective allopathic solutions to healthcare symptoms. Physicians don’t do this out of bad character, or lack of intelligence, but rather a combination of the exhausting and daunting battle against disease and poor human trainability and judgment, and a multigenerational culture of medicine that hugely overestimates the value and power of medications and surgery. These entities have preyed upon human nature which tends to seek “over simplification” of threat and anxiety provoking situations and conditions, engages in denial, as a defense, and ambivalence about major changes in one’s self, lifestyle, and relationships.

Thus, quick and symptom focused techniques such as medications, surgery for things that can be improved in other ways, and misinformation that overestimates the potential efficacy of the first two are offered and supported by the Medical Industrial Complex. People who are obese have stomach surgeries, and people with stressful lives and relationships are given stomach potions rather than assistance with improving choices and relationships. People with arthritis are given drugs that are dangerous on daily use and are not helped to exercise and increase their pain tolerance. People with sleep problems are sedated rather than taught sleep hygiene and stress and lifestyle management skills. People with chronic headaches are given opiates and other medications rather than skills at reducing tension in their lives. People with hypertension are given beta blockers and anxiolytics rather than teaching them to relax, enjoy a healthy lifestyle, and deal with their anger. The list goes on and on as we focus on the results rather than the cause. They have, with the exception of non-mainstream groups like the American College of Lifestyle Medicine and such groups, given up on leading patients to long-term, non-medication (or certainly replacement of short-term medication), lifestyle, and maturation and self-management approaches to healthcare. The medical establishment has not joined with Medical Psychologists and Lifestyle Specialty Physicians and included these disciplines in Primary Care Clinics and Community Hospitals. They have branded these groups as peripheral rather than Primary Care! The Government has been dominated by the Medical Industrial Complex and has not developed adequate staffing and reimbursement standards and policies for these facilities.

Even with all the science indicating the need to broaden the staffing requirements in Primary Care Centers and Community Hospitals, the core staff membership in these health facilities central to the healthcare system, and Psychiatric Hospitals, Residential Care Centers, Nursing Homes have not been modernized in generations. These facilities and private

practices have been the protected bastion of the scientifically and functionally archaic Medical Model and most generally admit to the staff only the medically trained provider. The belief that the provider trained in medical school is always the most qualified, highest qualified, or best leadership on a case is in opposition to much science and clinical experience, to documented disease origins and processes, and to rational thought! The idea is spawned from an era when it was more rational and true because there was not the wealth of information, multidisciplinary sciences and scientists contributing to healthcare, and when there were no other qualified doctorate level healthcare disciplines and providers available. But, to remain in an archaic perception of reality and not adapt to the emerging reality is “guild serving” at best, and the very definition of delusional.

Still, I have worked on Medical Staffs who locally broke with these traditions and exercised their legal right to admit me, a board certified psychologist with additional advanced psychopharmacology training to the Consulting Medical Staff in equal category and status to psychiatrists. They allowed me to attend medical staff meetings, participate actively in decision making and program improvement, and after experiencing my expertise called me in on all hospital and primary care clinic behavioral health and substance abuse cases and only prescribed psychotropic medications after I developed a diagnosis, psychopharmacological (complete with dosages) and psychological and family treatment plan. They saw to it that I had equal status in office space, access to records, assistance and collaboration with nursing staff and labs, access to doctors’ lounge and had doctors parking space marked with my name (Dr. Morris). At the local facility level rational thought and moving the best practitioners into the best position to do quality of care prevailed over Medical Industrial Complex and Medical Model traditions and guild pressures. Left to their own reckoning the community physician just wants to get the job done in the best manner possible. It is when national and state organizations and corporate power bases come into play that rigidity and barriers to using all within their scope of practice is stifled.

If health was conceptualized as maintaining a “biological homeostasis with drugs or scalpel” then the staffing and leadership of these facilities needed to rest on physicians and nurses. There was a time when we were this primitive, and this vision was true. We knew no better and had neither the resources, science, patience, nor stamina to invest in more sufficient and significant change in health status of patients. However, the realities of evolving science and training available in the healthcare professions has rendered the perception as having utility only for physicians and their economic wellbeing. These medical providers generally have scant training or ability to conceptualize the complexities and expansive science related to complex behavioral, attitudinal and philosophical modifications that are required to restore and maintain optimal health. Often, their behavioral and psychological training is at the level of a high-school teacher and they possess very superficial courses provided by a psychologist in medical school. Yet they have created an image of extensive training in all aspects of health and wellbeing. Many medical practitioners and students resent the psychologist as the “expert teacher” and have lobbied to keep them out of medical faculties. This is possibly because the superior knowledge of the psychologist tends to dispel the “Halo Effect” of “the physician knows the most about everything” that has become the “Branding Core Concept” of the pharmaceutical houses as they co-opted physicians into serving as their “drug delivery system”! One result is that over 60% of the addicts in the USA have a legal prescriber as their drug delivery system or in the supply chain of that system.

Over simplifications of diagnoses in the mental health and substance abuse area, superficial psychoeducation techniques inappropriately applied to the mentally ill (MI) and substance use disorders (SUDs) populations abound in the primary care system! Patients with

MI are diagnosed as a “feeling” (depression, anxiety, anger control problems), or an impulse disorder! This illustrates scant understanding of the complexity of diagnosing and treating mental disorders. Yet, we routinely put primary care physicians and nurses (many with two year degrees) in charge of a lifetime of care for many mental patients. The result is failure to stall the progression of the mental and addiction diseases, destruction of generations of families, loss of productivity and contribution to the economy and tax base, exacerbation and triggering of physical disease, unnecessary emergency department and hospital care, and huge long-term healthcare costs. Yet, few physicians, hospital administrators, healthcare policy wonks, Government science and regulatory bodies, and even psychologists are calling for significant rethinking of the staffing and program and leadership requirements in the Primary Care and Community Hospital Systems. These leaders are captured by a bygone past, strong guild resistance, and economic forces which reinforce them for putting up with the status quo! Thus, while they have the mantle and trappings of “leadership”—they are, in fact, “followers and visionless”!

Healthcare is becoming increasingly team and multi-disciplinary oriented. No one discipline can master the vast array of multidisciplinary sciences, and techniques. None can afford the practice time to be the meta-practitioner, or even to lead in all situations and with all diseases and patient populations. We simply must quit pretending and distorting reality and face the truth! In evaluating the level of distortion of reality in patients, doctors of psychology and psychiatry are taught a simple illustrative mnemonic, “Neurotics build castles in the sky, and psychotics attempt to live in them”! The “level of distortion and maintenance of an archaic construction, or attempting to live in a wholly non-existent one” must be evaluated in the USA healthcare system and its’ driver—The Medical Industrial Complex—must be moved out of control of healthcare design and management!

The Necessary Change

The strongest, most leadership equipped, and the most visionary physicians must come to leadership in the health care system. While some physicians and nurses will resist this—and no one can doubt the conflict of interest and significant guild and financial motivation to maintain the passé medical model—scientifically oriented and rational physicians and nurses will and are embracing the multi-disciplinary and health improvement and change future. Many enlightened physicians enjoy the introduction of the psychologist and the psychologist’s mid-level assistants (social workers, counselors, marital and family therapists, substance abuse counselors) into the Primary Care and Community Hospital System. These modern medical practitioners will move past the “medical model” to a more “holistic model” where they will partner with specialists in the psychological sciences who will treat the MI, SUDs, and life-style related patients in depth and meaningful and scientifically proven ways. This will allow these physicians and nurses to retain these patients and collaborate in long-term care of these patients; and the medical personnel and doctors of psychology and their supervised mid-level practitioners will cross fertilize and congeal the medical and psychological knowledge and abilities of each other.

These enlightened and more scientific physicians will be more willing to assist teams that have behavioral health experts and doctors with the time to significantly affect and manage MI and SUD patients. Everyone (the psychologist, the mid-level behavioral healthcare providers with a competent psychologist supervisor, the poorly geographically distributed psychiatrist who only has time to manage complex medicine (drug treatments) and physically disabled mental health cases, the general physician, the nurse, the facility administrator, the patient, the family, and the next generation of the family, the businesses dependent on the workforce, and the economic managers inside and outside of healthcare) stands to visit by reorganizing the staffing and standards of the general healthcare

system. The quality of care for many patient populations will improve! Arguments by the medical guild that “patients will be hurt” have not proven true in the areas of psychologist diagnosing, psychologists being on medical staffs, psychologists writing behavioral orders and making certain leadership decisions in hospitals, psychologists providing doctor’s opinions in court cases, psychologist prescribing psychoactive medications, etc. The science and healthcare experience dictates that if these changes are implemented the quality of the team’s knowledge and ability will be enhanced and long-term costs and side effects will be decreased.

In order to make this transition from the medical model to the holistic model we must avoid several dangers. The first is continuing to put physicians in charge of hospital and primary care staffs who resist change and have guild interests that supersede patient care interests. Of course these physicians will have prevalent financial, fraternal, and philosophical reinforcers to support their position. However, innovative “early adopters” and scientifically informed physicians will be the better choice and when placed in the leadership of facilities and programs will be able to capitalize on the available laws, reimbursement and incentive pay patterns, and competitive contracts and grants that will help them build multi-disciplinary and increasingly effective programs. Second, psychologists must realize that out of the 55 varieties of psychologists very few are trained to adequately do diagnosis, treatment of MI and SUDs and the medical and lifestyle aspects of physical illness! Most psychologists are simply not trained or equipped as “core healthcare providers”! This dirty little secret in psychology has allowed many psychologists to practice in or around healthcare facilities with little training and ability that can distinguish them from mid-level behavioral health providers! The medical practitioner is almost never aware that PhDs in general psychology, social psychology, guidance and counseling, industrial psychology, and many other types of psychology degrees have little or no training in diagnoses and treatment of mental disorders and behavioral aspects of physical disorders! It will be crucial that Hospital and Primary Care Center Chief Psychologists are well trained and capable of advanced diagnostic work, advanced psychotherapy, and to guide and supervise mid-level behavioral health workforces! The optimal Chief Psychologist would be a board certified Medical Psychologist with advanced training in clinical psychology and health psychology and medical foundations (psychopharmacology, biochemistry, anatomy and physiology, general pharmacology, pathophysiology, organic chemistry, etc.), and supervised preceptorships or post-doctoral residencies in medical facilities or collaborative medical practice. The strength of future facilities and programs will rest on the quality of chiefs of medical staff and chief psychologists.

Modern healthcare facilities and modern psychologists will become involved in medical facilities. These doctors of psychology with clinical training will be consulting and helping to review historical electronic records and diagnostics, select or prescribe psychoactive medications, performing specialty diagnostics, and formulating holistic treatment plans based on a mental status interview and extensive psychosocial history. They will make informed diagnostic and treatment planning decisions and write orders based upon obtained collateral records, a battery of psychological testing, and collateral family interviews obtained in a variety of medical and psychological facilities. This will lead treatment teams to facilitate comprehensive treatment plans, and case configurations rapidly and in a meaningful way (many times electronically for virtual teams)^{10, 11, 12}. Additionally, they will have to have good crisis intervention, short-term therapy, and mid-level practitioner supervision skills. They will have to respect and support their physician colleagues who have the arduous task of focusing on over 3,000 disorders while the behavioral health specialists have the luxury of focusing on about 100. They will have to be adroit at sensitively negotiating boundaries with physicians as colleagues and strong enough to refuse to be lumped with mid-level (in medicine or behavioral health) providers.

All primary care and facility practitioners and other specialist doctors will be pressed to cover larger volumes of patients who will increasingly have healthcare coverage and access to healthcare. They will do so in an increasingly capitalistic and price competitive environment where practitioners, facilities, and systems compete on a cost and product quality basis for area and specialty (diagnoses based) contracts. Thus, efficient multidisciplinary teams with both intervention and prevention skills will be in demand. Physicians, nurses, and psychologists will eventually realize that by being open to each other and collaborating they will compete well with other systems and have a much better chance of capturing greater market share (which translates into better income and job security for all). Telehealth skills will become a tool that most psychologists, especially in rural areas, will develop to be able to lead treatment teams and mid-level provider teams over a number of facilities and geographic locations. Increasingly, pharmacists will educate patients and may even become medication renewal prescribers (like many foreign countries where this has always been done safely and affordably). Substance abuse and dependency—devastating American worker productivities, family well-being, individual's health, and the economic picture in the healthcare system—will become a primary component of primary care centers and these programs will require a doctor of psychology to direct and manage them in a way that does not add to the already burdened general physician's stress level and loss of productivity, and embroil them in complex and time consuming behavioral and family interventions. This expansion of primary care centers and community hospitals will revolutionize and expand America's and educational institution's concept of what the role and mission, staffing, and management of primary care and community hospitals entails. Physicians, nurse practitioners, nurses, and psychologists will need to amass significant specialty skill in the area of the diagnosis and treatment of substance use disorders (SUDs)^{11,12,13,14,15}.

General physicians will become accustomed to multi-disciplinary team treatment and the luxury of not starting a psychoactive medication until a psychologist has worked up the patient, established an admitting diagnoses and recommended treatment plan (including medications, psychotherapies, medical studies and lab work that is indicated, and the formulation of a suggested multidisciplinary team), and have accepted that they do not have the training and experience to diagnose and plan for these disorders^{16,17}. They will become increasingly educated about the limited capacity of psychopharmacological techniques to treat mental disorders (<http://truthindrugs.com/index.html>). They have functioned with limited training in the areas of mental disorders, SUDs, prevention and life-style management, and family systems interventions and management. While a few enlightened physicians (Minuchen, Whitaker, Maltsby, Glasser, Beck in the early years and many more in recent years)^{18,19,20,21,22}, and the American College of Lifestyle Medicine (<http://lifestylemedicine.org/>) have pointed out for three generations the need for more psychological and holistic healthcare, primary care and biological psychiatry the drug companies have veered at a substantial variance to this wisdom. Lifestyle physicians are highly motivated and interested in these concepts and post MD/DO (medical) training in nutrition, physical education, and psychology. They should join with psychologists to advocate for more rational Primary Care Center and Community Hospital Staffing Requirements. These physicians should lobby for standards that require at least one psychologist and life-style physician psychologist team in every healthcare delivery system. Only then, and with these two very special doctors who are dedicated to causing health instead of just controlling disease and disease discomfort become a dominant force in the healthcare system. Not until physicians and psychologists join forces and return medicine to its psychosocial roots will healthcare systems have the leadership and broadened vision and thrust that can capitalize on new and emerging healthcare science and control the nation's healthcare costs, respond appropriately to the new longevity, and ensure quality of life in an increasingly aging population.

The Dynamics Driving Change to the Holistic Model and Multi-disciplinary Healthcare:

The dynamics driving evolution from the medical to the holistic model of healthcare include new scientific findings, scarcity and demand and overall healthcare economics, and a more sophisticated public that is increasingly difficult to herd into short-term, high risk and cost, and unsubstantiated treatments. The American, and even the world, consumer has started to move beyond gullibility and halo effect interventions! They have figured out the marketing ploys and shaping an thanks to the web and ready access to information, educate themselves and guard against them. Consumers have been liberated from dependency upon physicians for their science and healthcare education and information. They are often as informed or more informed related to the heuristic aspects and options of their specific disease state and related intervention and treatment plan options and risks than their physician or nurse. They are increasingly skeptical of those who are given artificial status to “think for them”! The modern patient has been so often misled, hoaxed, and inappropriately treated by politicians, employers, and the healthcare system that they are becoming realistically skeptical²³. A new era of a skeptical, informed, educated, and assertive consumer is emerging! This is one of the advantages of mass societal education and accessible information systems.

A second dynamic is that fact that MI and SUDs are now recognized as very prevalent in all health centers²⁴. The mental disorders are so prevalent in Primary Care Centers and Medical/surgical Hospitals that general physicians appear to welcome help with these complex specialty cases²⁵. Mental disorders are estimated to account for 12% of the global burden of disease, and yet only a minority of persons affected receives basic treatment²⁶, and one out of five patients in primary care clinics have these disorders, and nearly one of 10 have substance use disorders^{27,28}. The treatment of depression in primary care centers can be cost effective and can offset indirect medical costs²⁹. Major depressive disorder has a very high incidence in medical facilities. It has been recently found to be associated with high medical utilization and more functional impairment than most chronic medical illnesses. Major depression is a common illness among persons in the community, in ambulatory medical clinics, and in inpatient medical care. Studies have estimated that major depression occurs in 2%-4% of persons in the community, in 5%-10% of primary care patients, and 10%-14% of medical inpatients. The problem of sub-syndrome depression, which often manifests as serious depressive illness occurs in two to three times as many persons with depressive symptoms that fall short of major depression criteria. One-third to one-half of patients with major depression experience symptoms that persist over a six-month to one-year period. The majority of longitudinal studies have determined that severity of initial depressive symptoms and the presence of a comorbid medical illness were predictors of persistence of depression³⁰.

A secondary dynamic to the recognition of the prevalence of MI and SUDs and their incidence in primary care systems is the data, and patient experience, related to how poorly general hospitals, and primary care system, and the medical model has performed in the identification, diagnosis, and treatment of these disorders. The way depression is treated in the United States demonstrates a disturbing and changing trend toward superficial palliative care. Between 1987 and 1997 depression became an outpatient condition and the focus was on medication interventions which decreased several symptoms and basically gave up on changing the brain in any meaningful or growth oriented way. During this time, the use of psychotherapy declined (replaced by antidepressant medications even though there was little evidence of any major efficacy on the long-term of these drugs)³¹. In 1987, 37.3 percent of outpatients treated for depression received antidepressant medications and by 1997 the rate had doubled to 74.5 percent³². During the next decade from 1998 to 2007 the research documented a continued decline in the use of psychotherapy and sta-

bilization in the use of antidepressants to treat depression even though the science presented above indicated that just the opposite would be pragmatic. The trend toward outpatient treatment for depression increased significantly from 2.37 per 100 persons in 1998 (6.48 million) to 2.88 per 100 persons in 2007 (8.69 million). The increase delivered this substandard and marginally scientifically founded treatment to the least educated and most vulnerable Americans. The largest proportionate increases in treatment included blacks, Medicare patients, and adults with less than a high school education. There was a significant decline in depressed outpatients receiving psychotherapy, from 53.6 percent in 1998 to 43.1 percent in 2007. This, largely medication only approach caused expenditures for depression treatment increased at the national level, for medications, and for Medicare.

Another dynamic beaconing change from the medical model of healthcare is underlying philosophy which started with hope and turned into religion rather than science! Much of the problem centers around the “myth that mental disorders are genetically or biologically caused”! No scientist of renown or respect any longer subscribes to this myth, articulating the more validated and reasonable multi-component etiology of these disorders. Still, the core hope of the medical model, and the bioreduction philosophy was that “a biological or genetic anomaly would be found for every disease and this would lead to a mechanistic and easily delivered fix in the form of a mass produced, rapid delivery, and powerfully effective biological intervention.

Generally, allopathic medicine refers to “the broad category of medical practice that is sometimes called Western medicine, biomedicine, [scientific medicine](#), or modern medicine³³. The American healthcare system has evolved through a recent system of searching for chemical, surgical, humor balancing, and pathogen blocking efforts to eradicate illness and has finally come to realize that not all illnesses can best be approached in these ways. Certainly, many illnesses are influenced by these physiological and psychosocial states and modern scientists have come to believe in multipathway and multi-etiology illnesses which are the result of complex interplays of forces and effects on the human condition³⁴.

Recently, more advanced understandings of the autoplaticity of the central nervous system and its responsiveness to presses from the internal and external environment have made us realize that the brain indeed can and does change and with it personality, outlook, and capacity all change^{35,36,37}. The work of Eric Kandel, Philip Goelet, and others at Columbia University resulting in a Nobel Prize have determined that short-term memory is consolidated, put into permanent storage by growth of new synaptic connections that require intervening molecular genetic steps^{38,39}. Further, we now know a myriad of things, including drugs and medications can mutate or act as negative autoplatic presses on the brain⁴⁰. This great brain of ours changes for better or worse based upon with whom we interact, how we treat it, which drugs we take, and what experiences impinge upon it.

It takes 4-5 years to change the mind of a high school student to change their personality (stylized way of perceiving reality and the self and others and formulating behavioral responses) and subcomponents related to the brain, role and function in a family and community and society, and related skill sets, and interpersonal skills and social tolerances to the point that they can function effectively in the classroom. We say, “We have made them a teacher” (a professional mind)! It takes a three year apprenticeship to fashion the expanded personality, skill set, and cultural expectations and brain connections to create an analytic plumber or carpenter. We say, “We made them a craftsman”! It takes two years of premedical training and three to four years of professional school to create the brain, personality, acculturation, and vision and expectations of “a physician.” Because of the change

in their brain “we call them a doctor”! It takes four years of college, four years of graduate school, and one year of internship to train the basic clinical psychologist, and another two years of graduate school and one year of residency to train the medical psychologist. We then “call them doctor”! All are examples of the autoplaticity of the brain and the modifiability of the brain and its relatively enduring and characteristic ways of thinking, behaving, construing, and self-regulating “we call personality.” It is therefore logical and accurate to understand clinical psychology and psychotherapy as a “brain science,” “hard science,” and “brain modification”! That’s the goal!

The brain changes⁴¹, and therefore personality can change. Brains, grow, make new connections, modify themselves, and change⁴². The mechanisms of how the brain changes and grows new neuronal connections by virtue of switching on and off genes in the neuron nucleus are becoming better understood. Experience is the essential component in setting this change in motion. The Nobel Prize winning scientist, Eric Kandel, indicates: The fact that a gene must be switched on to form long-term memory shows clearly that genes are not simply determinants of behavior but are also responsive to environmental stimulation, such as learning⁴³. Since the work of Kandel and others have become disseminated worldwide, no scientifically trained and well educated practitioner can doubt that focused and engineered experience, like psychotherapy, is a necessary component of any well-conceived healthcare delivery system. Finally, and most importantly, medication only approaches are not likely to be effective as standalone interventions in the treatment of brain driven illnesses⁴⁴.

The brain changes for the negative with negative experience. We now know that childhood trauma and stress can increase a child’s chances of everything from mental disorder, addiction, and health problems to dramatically decreased longevity and ability to heal from disease⁴⁵. Even though managed care and its advocates have attempted to change psychotherapy into a short (6-12 session) psychoeducational intervention, there is ample evidence that it takes nearly six months of intensive treatment to make beginning changes; and the longer you stay in treatment the more positive the outcome⁴⁶. We have extant models for brain modification and recovery growth which summarize the autoplaticity research, delineate the neuroscience of psychological therapies, and describe related techniques and procedures⁴⁷.

Even parents of generally considered normative children realize that augmentation strategies related to grade achievement, selection test performance, and competition with others “change children’s brains”! We now realize that the aging brain can have decline retarded with augmentation strategies (brain modification). We know immersion techniques are powerful changes of language, acculturation, and ethno-insight (brain change)! To give up on the brain, related personality, and related growth is a pessimism that healers simply cannot afford! Yet, when we use bio-reduction, limited efficacy, and high risk/cost medication interventions for mental illness—other than viewing these medications as one short-term technique and component of a more comprehensive brain change and growth program—we succumb to an illusion unsupported by science, and to pessimism and hopelessness! This pessimism is often witnessed in medically trained individuals who adopt the jaded philosophy that “the mentally ill never change and the best we can do is control symptoms”! This pessimism and philosophy has permeated much of the medical literature and the attitudes of the poorly trained and educated. Patients should run, not walk, from healers with such attitudes!

Practitioners of the future will have to explain to the patient how our psychoactive medications theoretically work (by disrupting normal neuronal functioning so that their acting out

or in symptoms are lessened) and how our real goal is to capitalize on neurogenesis and neuroplasticity or growth to eventually get them off psychoactive drugs. Thus, the short-term application of psychopharmacology techniques is to “knock off the rough edges” of their personality by controlling 15-25% of symptoms temporarily so that they can learn and grow and function more effectively. Meanwhile, “Brain Change and Growth” is a more overarching and important goal with promise of removing the several risks of mutation of their central nervous system and organs and genetic switches in a way that can permanently change them negatively (side effects). Based on ethical and informed consent and mal-practice risk management, the practitioner will review the science indicating that none of our psychoactive medications cure or permanently handle the symptoms of mental illness with the patient and the families. Given the current state of science, health care providers are responsible to fully inform them of the significant limits of medications like antidepressants and that the science shows that they do not work at all with over half of individuals. The provider must alert the patient to the data indicating that they only work marginally better than placebo with the minority getting a positive effect. The practitioner must educate the patient about the scientific reality that we do not have a psychoactive medication which cures or significantly modifies personality deficits. We must ethically and professionally inform them that neurogenesis and autoplaticity offer a hopeful opportunity to change their brains, brain-based personality, and to modify the future of subsequent generations of their families^{48,49,50,51,52}. The competent practitioner and healthcare team will be bound to explain that most cases of significant mental disorder have a significant and multi-generational family systems component and that the inclusion of the family and family therapy in the treatment plans is one of the most effective configurations of treatment.

One of the dynamics of decline of the family, Governments, and healthcare system is the loss of capacity to teach Self-Regulation (A Complex but Necessary Skill): Antidepressants as a Stand Alone Technique represents a primitive and Inadequate Approach to the modification of the brain/personality/depression syndromes^{53,54,56,56,57,58}! I and psychophysiolgists have written for years about the complexity of brain regulation and the emergence of that capacity to organize perception, understanding and insight, problem solving, goal directed behavior and strategies, learning and memory into realistic perception, choices, and self-management. In reality, humans have not one brain, but rather several brains that developed as specialized brains over the long period of evolution. These competing or collaborating brains require constant internal monitoring and switching among appropriate sectional expression or dominance and submission. The mature or—healthy human being is practiced at regulating the many brains and brain systems and choosing and energizing and sustaining appropriate and goal directed behaviors. They have logged thousands of repetitions of self-regulation with guidance, correction, modeling, and fine tuning until new neural networks and connections exist or—in the more prosaic languages of psychology objects—are interjected, internalized, and solidified into object permanence. In other words genetics and genetic transmission shaped by evolution guides the construction of basic underlying brains (or brain types). These brains have more or less basic underlying patterns of circuitry, lobe and sectional specialization, and neural connection patterns throughout. For instance, genetics leads to a dominant brain/section functioning for emotions and impulses, one for vision, one for attention and recognition, and another for working memory, and still another for conceptual memory, etc. The tendency to emphasize one brain over another exists, but experience and training define the way we choose to use and regulate this category of brains and their coordination and selective expression.

As the individual grows and interacts with the environment the autoplatic brains grow and establish interacting neuronal ties with different areas of the brain. Eventually, neurons that are fired frequently fire more quickly than others, some neuronal systems become autore-

ceptor oriented and act as brakes on neuronal systems, mirror neurons form and allow for modeling and vicarious learning and differentiation of the brain^{50,51,52}. Some areas of the brain become supercedant to others and act as integrating or output controlling brains. In actuality, the human brain has demonstrated great capacity to learn and change given the proper motivation, feedback, and practice in virtually every paradigm that has been tested. A component of depression is global negativity. This view that who one is, what one has access to in regard to satisfying needs, and that others and the world are fixed in a negative schema can create delusion of hopelessness and helplessness and results in negative brain change! We now have science that clearly indicates that what we experience and what we think about experience changes our brains. The depressed person no longer self-regulates or organizes brain area collaboration in a rational, effective, and goal directed manner. The depressed person, in this philosophical position, sends biological messages to the brain which causes it to conserve energy and resources by giving up, not developing goals and strategies, lowering activation levels, and becoming cautiously disengaged!

If we could find a pep pill (SSRI) that could overcome this philosophy and withdrawal and loss of interest we would be blessed indeed! Still, this negative self-view, other-view, and world view, once solidified and fixed, protects the patient from “dashed hopes,” “memories of failure (pain),” “embarrassing efforts during skill inadequacy/acquisition,” and “seeming useless and unnecessary effort”! Thus, the secondary gain and related natural reinforcement can ossify the depressed philosophy and cause the patient to develop well known rationales to defend and protect the hopeless and helpless schemas.

Should we really be so inane that we think “a little pep pill will take care of this”! Still, this is the prevailing belief exemplified by the average primary care physician who implements an antidepressant only approach. Certainly, a little extra pep may punch up a HAM-D or other simple questionnaire two to four points (as the French say Wallach! Or, as the South Americans would muse-Ago Mas?). But, have we really “treated the depressive syndrome and related perceptions and attitudes and philosophies underlying the brain change? Or, have we just put a little more pep into our depressed patient and congratulated ourselves far beyond our just deserts?

To the informed, such approaches must appear completely narcissistic (to be so enthusiastically congratulating ourselves for such a puny drug intervention), and out of touch. We must appear to have total failure of faith, hope, and love (self and others) represented by this delusion of doom and pessimism and ignorance of the marvelous autoplaticity and growth potential of the human brain! Often we cast subconscious reinforcement of the giving up and pessimism by our cavalier and self-serving (because it is easy and not time consuming for us) delivery of a medication only techniques! The small bump of hope and energy with a probable placebo effect surely runs its course and reinforces the pessimism when the patient’s brain does not really change, up-regulates and adapts to the “pep pill,” and the syndrome does not change and relapse is all too often inevitable! Then, the pessimistic physician and psychologist say, “You’ll probably have to take this antidepressant for the rest of your life”! We create another “hope bump” with prescribing an augmented dose, or switch to another antidepressant. This is likely (according to the research) to run its course and results in feelings of failure and hopelessness. We eventually progress to the stage of being depressed with the job of treating rigidified depressive perception ourselves.

Still, the elite psychotherapists understanding of the marvelous autoplaticity of the brain can prevail against this inane reductionism. They comprehend that the epigenetic quality of the human brain, personality, and life’s trajectory with regard to our ability to change is

an essential! Depression cannot be treated by the pessimist whether they are using a drug delivery system, lobotomy, or a cynical philosopher masquerading as a psychotherapist. Growing awareness of the limitations of efficacy of psychoactive medications such as the rate of treatment response following first-line treatment with SSRIs has made us take stock of the importance of the brain, personality, and course of human life cycles relative to change capacity rather than—symptom control and palliation. Even the top physician researchers are now realizing the importance of working with the patient’s brain development and life’s trajectory and denaturing and damaging experience^{18,19,20,21,22,23}.

Antidepressants:

The best, but certainly not the only, example of “obsession with medications” to the exclusion of more comprehensive science is the SSRIs. The SSRI effect is moderate and really has nothing to do with positively changing the neural structure and connections in the CNS (actual and lasting brain modification in a meaningful way)²³. Antidepressants work for a minority of only the most severe depressives and provide marginally significant effect over placebo which has an effect of similar magnitude⁵⁹. Even though studies about antidepressant minority symptom control show that the drug companies imply that—medications are the medical model’s “first line” (preferred) solution to depression, in reality—and substantiated by a growing body of science—SSRIs literally work only marginally above placebo and in a minority of patients! If subjected to the requirement for powerful magnitude of effect and “scientifically validated treatments” in order to get approved for reimbursement, “stand alone antidepressants would not be reimbursed” by most third party payers! Still tradition and the religion of antidepressants continue to make them one of the most prescribed medications! General physicians, having only antidepressants as an intervention for depressed patients and usually devoid of the diagnostic training to define which type of depression presenting (Dysthymia, Major Depression and its subtypes, Psychosomatic Disorder, Bipolar Disorder and its many subtypes, Schizoaffective disorder and its subtypes, depressive episodes superimposed on Schizophrenic spectrum disorders, or brief depressive disorders in individuals suffering from Character disorders) are “put in charge of the treatment of most depressed patients in the US”! It has been estimated that 80 percent of antidepressant medications are prescribed by general physicians⁶⁰. This is a situation that strains credulity!

Remission rates (what drug companies and drug researchers call scores in the normal range on short and poor validity and reliability symptom check lists like the Ham-D) vary from a puny 30 to 45 percent⁶¹. The drug companies, and the average physician and psychologist are using antidepressants as titular “one trick ponies.” This occurs, even though most persons taking antidepressant medications will develop recurrent symptoms of depression while on the medication therapy, and most will return to depressive episodes within the year post treatment initiation^{47,62,63}. This makes perfect sense only if you have given a “pep pill” and haven’t really modified the global negativity and related non-goal and satiation oriented behaviors. How can physicians continue these “medication only approaches” when only one third of patients given antidepressants improve significantly? Placebo is just about as effective (non-chemical, or active component)⁶¹, and only in the severe depressions (less than half of depressive illnesses) do we get really noteworthy effect. Thus, the “traditional first line and very expensive intervention of the primary care and medical establishment” may really work for less than 10% of total depressive illness. Yet, many psychological, medical, and scientific societies are nearly silent about this situation and clearly have little passion to take up this battle with the Medical Industrial Complex and the corporations driving it. If your tire salesman, or butcher, delivered a product that worked for you only 10% of the time you’d have real problems with that! Still physician referral sources and third party payers herd patients like chattel into these very marginally effective hands and approaches!

Thus science indicates resoundingly that “antidepressants cannot qualify as a stand-alone or first line treatment for depressive illness.” As a medication only treatment they represent a marginally ethical and unscientific professional activity and at worse a collaborative (between prescribers, Government agencies, drug companies, and healthcare institutions) hoax^{44, 47, 61, 64}. Top practitioner and guideline groups and now on backwater (never directly published on their website) the FDA are on record supporting the idea that medication only approaches are not recognized as adequate or recommended for the treatment of most mental disorders (see FDA letter published at www.amphome.org; click on the “Links” tab in the left column and go to the bottom of the section).

Summary and Conclusions:

As the multi-pathway etiology of mental illness became apparent in the science driving the healthcare system, and the autoplaticity of the brain became firmly established, and as health and science information exploded onto the internet, old myths related to genetics as a universal cause of disease, the hopelessness of fixed gene determination gave way to genes as switches and triggers influenced by environment³⁵. Recognition and management of mental health problems reduce the inappropriate use of medical and surgical care, thus reducing health care costs became one of the top primary care goals.^{7, 8, 9, 65}. Soon, the legal establishment will teach drug companies and prescribers that medication only approaches to the treatment of mental disorders are an inadequate and malpractice treatment plan (see: <http://www.vaughns-1-pagers.com/medicine/index.htm>). Innovative and early adopter physicians and healthcare facilities will include psychologists and their several mid-level behavioral health assistants in their hospitals and primary care systems. This will have great potential to cut long-term and catastrophic medical costs, increase system quality and efficacy, and improve the system’s ability to contract in the emerging accountable care and competitive contracting era! Wise administrators will catch this vision and will hire a flexible and multi-disciplinary and holistic model chief medical officer and a compatible chief psychologist. Such innovative teams with a competent CEO (MBA or PhD) will drive the entrepreneurial healthcare systems of the future. They will have to be strong individuals who can redress the guild interests in the medical establishment, pharmaceutical houses, medical schools and psychology programs at universities, and in their workforces. Still the stakes and rewards will be very high!

Here are some strategic planning bullet points that might help such an innovative leadership trio!

1. Bust the myth of a single a biomechanic or genetic cause of mental illness and substance abuse with clearly stated program philosophies, plans for professional services, staffing and privileging plans that are truly multidisciplinary and allow all to practice to the extent of their licensure!
2. Gear up for team treatment, teamwork, and team system philosophies.
3. Always start with adequate diagnoses in MI and SUDs, and only then proceed to a comprehensive technique treatment plan (which may include short-term-like medications, exercise, light therapy, etc., and long-term growth oriented therapies).
4. Put the most relevant doctor on staff in charge of the team (the team leader in some cases should be a physician where complex medical diagnoses complicate a depression and a psychologist in others where the medical expertise is secondary in relevance to the psychological and family and life-style issues). Put the chief of psychology on the active medical staff so that teamwork and coordination emerges.
5. Force cross fertilization. Have mandatory medical and psychological education, outcome evaluations, post-case reviews and autopsies, and access to a library that

helps encourage mastery of the science and related publications.

6. Understand how to hire an adequately trained chief psychologist that has a reasonable chance of succeeding in the highly complex, stressful, demanding medical facility environment and culture. Psychologists, and especially Medical Psychologists (see: <http://www.amphome.org/>) will be more versatile (trained extensively in advanced diagnostics, psychopharmacology, psychotherapy, and health and lifestyle counseling and interventions), cost effective, and primary care team compatible than psychiatrists and psychiatric nurses with very limited physical health and pharmacology training. General physicians, prescribing the psychoactive medications for almost two of every three patients with mental illness will need the specialty diagnostic, psychopharmacology, and follow-up monitoring and psychotherapy collaboration with psychologists to ensure quality of care, spread and cover their liability, and prevent excessive consumption of their primary care practice time.
7. Bust the myth that psychiatrists are the chief mental health diagnosticians and are the leadership in hospital units, mental health centers, and are necessary for leading the treatment of the most severely mentally ill. In reality psychiatrists are in such small numbers and limited geographical distribution that they could never assume or cover the leadership and treatment roles for the severely mentally ill. They generally do medication management and very little psychotherapy and advanced diagnostics, make a few minutes of rounds in psychiatric hospital units a day, and don't really do much more than approve decisions of much lesser trained staff (RNs and mid-level counselors). This situation creates a "sham leadership and quality of care" phenomena that is a false front, and the situation contributes to barriers to development of mental health hospital beds, day treatment programs, residential care beds, community mental health centers, and effective outpatient facilities. A senior psychologist diagnostician in collaboration with a well-trained general physician can more comprehensively diagnose mental and physical illness and devise a more accurate diagnosis and comprehensive treatment plan. Laws and rules should be modified to remove these barriers, utilize the doctor of psychology leadership workforce and geographic distribution and economic accessibility, and services could be expanded.
8. Remove the barriers to long-term psychotherapy and brain remodeling for the severely mentally ill and dually and multiply diagnosed patients. Even college faculty are given 4-5 years to remodel the brains of students, and the remodeling of brain based personalities takes time and must additionally dissipate resistance and aberrant learning barriers.
9. Ensure that all mental health treatments of children and adolescents are required to start with diagnoses of the identified patient, individual family members that report symptoms, and the family system. Medication only and individual psychotherapy only approaches to these disorders should be prohibited and reimbursement barriers to comprehensive diagnoses and treatment of these families should be removed.
10. Bust the myth that appropriately post-doctoral and psychopharmacology trained psychologists and Board Certified Medical Psychologists (see www.amphome.org) are "unsafe diagnosticians and prescribers" and allow them to prescribe psychoactive medications for patients that they are treating with psychotherapy, family therapy, substance abuse therapies, neuropsychological deficits, and behavioral aspects of medical disorders. These psychologists have written millions of prescriptions and managed mentally ill patients in several states, all of the military, and in other organizations in the US and the world.

My suggestions for community Medical and Clinical Psychologists are as follows:

1. Find your community health facility pressure points and interface with them to advance psychology in your facilities. Often these pressure points are Hospital and Primary Care Clinic Administrators and Managers, Chiefs of Medical Staff, Senior and Revered Physician Medical Staff Members, and Hospital Board Members.^{10,12,24}
2. Educate everyone about the training and scope of practice in psychology and the doctor of psychology's federal and state statutory authorities to independently diagnose and treat mental disorders, to write appropriate behavioral and diagnostic orders in health facilities and authorize appropriate treatment plans, to consult with other providers on psychoactive medications and/or prescribe medications, and to practice legally in hospitals and health care facilities and to serve on medical staffs.
3. Ensure that your state's Medicaid Plan filed with the federal government adequately reimburses psychologists for the performance of duties and scope of practice outlined in state law.
4. Join other psychologists in raising political action resources and educating the public about the views and proclivities of candidates.
5. Get full-time practitioner psychologists appointed and elected to psychology state licensure boards.
6. Support practitioner associations who adopt the policies and programs outlined in this paper.
7. Support public education programs which contrast the outdated Medical Model approaches and a more modern health care system of delivery.

The problems in the mental health system related to the high costs of "medication only approaches" (higher long-term medical costs offsets, higher incarceration rates, higher emergency department use, limited personality and lifestyle change leading to lost productivity and potential, failure to change the multigenerational trajectory in dysfunctional families and repeated and amplification of the above costs, and ethical and credibility impoverishment in the mental health and healthcare system) are huge! The costs of turning the mental health system over to the few psychiatrists in the USA and their tendency to desert treatment and practice with largely "medication only approaches" and abdicate getting consistently and intimately involved with patients and families and in "hands on and fully involved" leadership roles in psychiatric hospitals, residential care centers, day treatment centers, and outpatient programs has reduced the quality of the system significantly. The failure of psychologists to speak up about these things and their willingness to collaborate and collude in the "hoax system" is embarrassing. The failure of the Government to investigate the "fly by" (few minute) medical rounds provided by most psychiatrists on inpatient units, the signature of stacks of treatment plans without any real understanding of the patient and their diagnoses and their course in the treatment center, and the running 8-10 patients through (supposed 20 minute) medication checks and medical psychotherapy an hour in outpatient settings and to interview the patients and find out what is really going on under the auspices of "leadership" in the mental health system is embarrassing.

The mental health tragedies related to acting out and ultimate imprisonment of the mentally ill, death by overdose, acting out and harming others, and mostly just giving up on the mental health and medical systems is a Great American Embarrassment! Well educated physicians and psychologists hear these high profile cases in the media and never raise the question "were they adequately diagnosed and in appropriate treatment"! These psychologist and physician doctors don't bother to challenge the media when they "tout

taking a medication as if that is TREATMENT rather than simply a small technique that has no chance of changing the person"! Still, these are not hard things to know, figure out, or investigate. The fact that they continue is a testament that pretends and looks the other way.

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Psychology's Business is Your Business

Jack G. Wiggins, PhD

Editor of Archives

Your business as an integral part of the business of psychology is caught in the politics of the changing times. The axiom that "All Politics is Local" is based on local grassroots actions that increase incomes of participants more quickly than strategic long range programs that have to be coordinated with others. The focus here is on the business aspects of your practice that can increase your income and prestige in your organization and community as a practicing psychologist. This can be accomplished by investing your time and energy by upgrading your scope of practice through psychological advocacy.

Many professionals still neglect asserting themselves and promoting their skills by hiding behind the belief that "advertising themselves" is unprofessional. Yet, their business of psychology suffers daily by the onslaught of advertising by pharmaceutical company claims their products are better than psychological treatments for the condition or symptoms the consumer may have. Psychologists, like most professionals, turn to their State or national organization to protect their interests paid for by their organizational dues. However, dues money is typically devoted to maintaining and/or building the organization and little funding is leftover for Advocacy. What little money is left for Advocacy is fought over vigorously by competing interests within the organization.

Successful organizations develop structures to segregate Advocacy funds to prevent their Boards of Directors siphoning off moneys for "needs" of an organization. If organizations fail to segregate Advocacy funds from their maintenance needs, they find themselves stagnating with bloated budgets focused on internal issues rather than a vigorous advocacy to serve their members purposes. This leaves open the question of who is responsible for Advocacy for the survival of the profession—the organization from contributions to their State and national bodies—or members creating "sweat equity" by working hard and doing things for themselves?

"Privileges Quest Fizzles" was the title of a lead article in the New England Psychologist. This April 2014 Issue. was disturbing because of inaccuracies that were misleading about the current status of prescribing medications by psychologists. Illinois was in process of successfully passing S2187 authorizing prescriptive authority for trained psychologists. An APA spokesperson was cited as saying APA originally backed practitioners' drive for prescriptive authority by creating a task force in 1989 but has not seen much renewed interest. "It's been known for a number of years that there is a shortage of psychiatrists in rural areas where access to mental health services is an issue." Such statements lay blame on the APA membership rather than on the lack of APA leadership." She added, "That said, historically, prescription privileges for appropriately trained psychologists has been a state level initiative. The APA Practice Organization is not aware of any New England states with prescription privileges legislation." This ignores the fact that New Jersey still has an active prescriptive authority bill in its legislature and the RxP success in Illinois.

When budgets for psychological services are being cut and psychological practices are being squeezed by managed care, the focus comes down to you and the personal choices

you must make as an advocate for your practice of psychology and still maintain your standard of living. *The choice you cannot afford to make is by failing to participate in Advocacy for your practice.* By not participating you will have paid a penalty fees in your reduced reimbursement returns that have stagnated or diminished over the past decade. Pay rates may be reduced further if doctoral level psychologists are forced to compete with master level counselors pay rates in the new Affordable Care Act. Through training in prescriptive authority and Advocacy you should be able to increase your income even without State authorization for psychologists to prescribe. Several States are prepared to follow Illinois' successful enactment of prescriptive authority for trained psychologists. With increased demands for prescribing psychologists, Medicare, Medicaid and Managed Care reimbursement rates will go up to the a equivalent to those paid to physicians. Thus, the Return on Investment (ROI) from Advocacy can more than offset your costs of training and advocacy!

Local grassroots Advocacy activities are presented in the Appendix [Column Local I] that can help you make your personal choices. *These actionable items are designed to help you improve your practice and your status as a psychologist in your community.* They can also have strategic implications for expanding the scope of practice of psychology at the State and national levels. Personal choices must take into account the political context in which psychology as a business is facing. Licensed psychologists are the largest single group of practitioners in psychology but also maybe the least well organized. The Veterans Health Administration is the largest single employer of psychologists in the nation. How psychology will be situated as a health profession in the Affordable Care Act is an unanswered question for all psychologists as is the fate of this legislation itself.

The delays in treatment of Veterans with PTSD and other mental conditions has led to the national scandal in the VA. If the VA is failing to provide care for Veterans with PTSD and mental conditions and effective care is not promptly provided we have a community crisis and a greater need for professional Advocacy. Delays in treatment of mentally ill in prisons and lack of access to mental psychological care in jails are major questions that psychologists can address collectively. For example, the Memphis Crisis Intervention Team Model founded in 1988 is a dramatic example of how resolution of a mental health crisis in this community became the inspiration for innovation. Now over 2700 other cities to provide humane care for the mentally ill by training police to use psychological intervention successfully. San Antonio, TX has saved \$10 million a year by integrating services for the mentally ill in jails, hospitals, courts, police and psychological services 8 years ago (<http://knau.org/post/mental-health-meets-moneyball-san-antonio>).

The success of these programs is the result of rapid response with crisis care for those who are terrorized by their mental loss of a sense self and are searching for a cause with wild thoughts and are frantically trying to regain control by acting out their dilemma. Failure to provide prompt intervention intensifies their desperation and prolongs time needed for their recovery. Phoenix, AZ initiated its mental health crisis program in 2001 and in 2013 diverted over 19,000 people in mental crises with prompt mental care instead of delayed treatment in hospitals or being isolated in jails.

Psychology's future in health care hinges on States' successful enactment of prescriptive authority legislation for trained psychology practitioners that begins with local advocacy. In the past "practitioner issues" such as licensing of psychologists and hospital privileges for psychologists have been second tier "State Issues" in APA. APA political advocacy has focused on issues affecting research grants rather than practice issues. APA became involved prescriptive authority for underserved populations only after the urging of

practitioners. With the implementation of the PPACA Act looming, it is urgent for psychologists to unite locally and alert their legislators to the benefits of prompt health care that licensed psychologists provide in the community.

This paper illustrates the axiom that “all politics is local” applies to *advocacy for psychological practice* rather than quibble over the relative importance of various national and State issues. My Advocacy Chart appears in the Appendix. Its 18 cells are headed by columns titled Local I, State II, and National III. Then there are three Government rows are titled Administrative, Legislative and Judicial. The Private Sector appears below with three rows titled Businesses, Consumers and Professions that considered under the three columns of Local, State and National. Priority of presentation is given to Column Local I issues that can have a high impact for State and national importance of psychology in public welfare and humane well being. The Memphis Intervention Team example is cited the chart as local I (a.)

Advocacy issues must be addressed by each of us as individual psychologists and collectively with our local colleagues. The items listed are considered representative rather than comprehensive. The one thing left out is—*There is no request for money!* Psychologists are already paying enough dues to build and maintain organizations with good intentions. Expected benefits as “returns on investment” (ROI) from membership dues is often minimal since there is no guarantee how your dues will be spent on issues important to you. It is time for psychologists invest their time, energy, earned CE credits for RxP training and Advocacy for causes that are dedicated to their specific interests.

Psychological Advocacy can be very satisfying when you work to achieve your own professional goals and is especially satisfying when your efforts also advance *your chosen profession!* After reviewing the Advocacy activities below, ask yourself, “*What can you do to improve your professional work as a psychologist? Can you make a pledge to yourself that you will carry out one instrumental act to improve the business of my practice each week?*” If you can, you can call yourself a “professional Advocate” and be invigorated by personal interactions with professional Advocates that share your interests. Issues facing the business of psychology are now listed in the Appendix that might be of special interest to you and may also help you find colleagues with like interests.

The overarching thrust in healthcare today is to integrate Mental and Physical treatments. Psychological practitioners support “integrated healthcare,” but access to integrated care training been limited because of shortages internships for psychologists to serve public health care needs. Integrated healthcare implicitly presumes physical health care but ignores behavioral health as a first line treatment of mental conditions and an entry point to primary healthcare. Behavioral healthcare can gain legislative endorsement with public with statements of its explicit benefits to healthcare.

“*Accelerated behavioral healthcare*” is a value-added term that explains how trained medical psychologists expedite both prompt psychological and psychotropic treatments to an underserved public. The rapid responder crisis intervention model demonstrates that humane behavioral treatment can be effective in crisis situations even before the one or two weeks of the psychotropic medication can typically take effect. Thus, behavioral healthcare is accelerated health care and must be the entry point into the health care system. Licensed psychologists with medical psychology training can expedite diagnostic and treatment procedures by providing both psychological and psychotropic treatments for the benefit of patients. These combined treatments can reduce patients’ anguish, improve daily functioning and restore health. Accelerated behavioral healthcare links the patient with a

behavioral healthcare specialist early treatment process. It avoids costly delays in care resulting from using primary care procedures to rule out the possibility the patient's mental condition is due to a physical disorder before referral to a behavioral care specialist. Costly laboratory procedures and other tests, clinical examinations and consultations or an emergency room visit may equal or exceed the costs of the entire course of treatment for a behavioral or mental disorder and delay behavioral care up to several months.

The future of Medicare, Medicaid and the Affordable Care Act appear are headed toward integrated healthcare and incorporated group practices. The ACA pays for Rapid Diagnosis and treatment. Psychologists desiring to participate in the healthcare market would do well to train for *Accelerated Behavioral Healthcare* as a Medical Psychologist as a practice option. Board certification information and training options as a Medical Psychologist are available at <http://www.amphome.org>.

APPENDIX

Advocacy Areas of Psychologists

Government A

Local I	State II	Federal III	
(I) (A) (1.)	(II) (A) (1.)	(III) (A) (1.)	Administrative (1)
(I) (A) (2.)	(II) (A) (2.)	(III) (A) (2.)	Legislative (2)
(I) (A) (3.)	(II) (A) (3.)	(III) (A) (3.)	Judicial (3)

Private B

(I) (B) (1.)	(II) (B) (1.)	(III) (B) (1.)	Business (1)
(I) (B) (2.)	(II) (B) (2.)	(III) (B) (2.)	Consumer (2)
(I) (B) (3.)	(II) (B) (3.)	(III) (B) (3.)	Professional (3)

Local (I) Government (A) Administration (1).

(a.) **The Memphis Police Department Crisis Intervention Team (CIT)** is an innovative police based first responder program that has become nationally known as the “Memphis Model” of pre-arrest jail diversion for those in a mental illness crisis. This program provides law enforcement based crisis intervention training for helping those individuals with mental illness. Involvement in CIT is voluntary and based in the patrol division of the police department. In addition, CIT works in partnership with those in mental health care to provide a system of services that is friendly to the individuals with mental illness, family members and the police officers.” See CIT website at <http://cit.memphis.edu/>

(b.) **Jails**

County and city jails have become the new mental hospitals of the 21st Century. Prisoners with mental health treatment issues comprise between 10% to 20% of the population of a jail. The Los Angeles County Jail and the Cook County Jail in Chicago are the two largest mental institutions in the United States. Access to mental care of inmates in county jails is highly variable. County Sheriffs have the primary responsibility for both mental and physical health care of the inmates. Even though psychologists may not prescribe in a given State, psychologists can and do make recommendations for health care and the prescribing of psychotropic medications to prescribing medical

personnel working in public facilities. Typically, Sheriffs are looking for additional mental resources for care of their wards and are open to mental services by psychologists. Sheriffs are powerful political figures in a community and the State Sheriffs Association is a powerful lobby in State legislatures. It is important to cultivate Sheriffs to be political allies of psychology. The recent Illinois S2187 bill for prescriptive authority was passed with the support of County Sheriffs.

(c.) County Health Departments

County Health Departments are the political homes of medicine. Often they are open to medical and clinical psychologists. Contacts developed there can be useful in obtaining staff privileges in hospitals and working on health issues as they arise in the community.

(d.) Community Hospital Associations

Psychologists with staff privileges sometimes find opportunities to serve on Committees and Task Forces of Local Hospitals that are useful to themselves and their communities acceptance of psychological services. It is a good practice builder especially in communities with a single hospital and limited healthcare resources.

(e.) Skilled Nursing Facilities (SNFs)

Psychologists are enumerated providers in the federal regulations of SNFs. Nursing homes are often willing to accept services of psychologist due to the shortage of psychiatrists. This is typically done by contract arranged through the Administrator of the SNF or the organization that owns the nursing home. Usually there is a close tie between Administrator and the Attending Physician of the SNF. The designated Attending Physician is the only person that can prescribe medications in the SNF. Thus, the Attending Physician must have confidence in a psychologist's medication recommendations and must be willing to work with a psychologist in the behavioral care of patients.

(f.) Community Mental Health Centers

Community Mental Health Centers are typically the lobbying arm of a community for mental health services with connections with elected officials. These relationships are so varied and often times it is better to be part of that community healthcare network.

(g.) Consulting with Schools

(h.) Consulting with Police and Fire Departments about PTSD or managing mentally disturbed individuals.

(i.) Contracting with the military, National Guard and VA to provide community based services and telehealth care to Veterans and military families living in rural areas.

Local (I) Government (A) Legislative (2)

(a.) Grass Roots Efforts

It is incumbent on every practitioner of psychology to be active in local community affairs. Writing letters to the editors of newspapers and weekly neighborhood community papers falls in this category. This also includes attending political events, voting, meeting with your elected officials, contributing to political campaigns and developing relationships. Failure to do so is considered "gold bricking" in your practice. If you have read

this thus far, “gold bricking” probably does not apply to you. Yet, you probably recognize that you should be more active in support of your practice with community involvement, as well as, in State and national psychological initiatives.

Local (I) Government (A) Judicial (3)

(a.) **Judicial**

Local jails have already been mentioned as a point of psychological advocacy. There are other areas of forensic interest that will only be numerated here.

(b.) Juvenal Justice Courts

(c.) Mental Health Courts

(d.) Courts for returning Veterans

Local (I) Non-government (Private) B Business (1)

(a.) Business opportunities for clinical and medical psychologists abound in every community for alert assertive health practitioners; hospitals nursing homes, rehabilitation facilities, group homes, schools and other health related facilities.

(b.) Consulting with corporations about health care benefits for employees.

Local (I) Non-governmental (Private) Consumers (2)

(a.) Affiliate with Red Cross Disaster Teams.

(b.) Join Veterans organization such as the VFW, American Legion of AmVets.

(c.) Affiliate with church and religious groups providing services

Local (I) Non-governmental (Private) Professional (3)

(a.) Join local psychological groups

(b.) Affiliate with colleagues in a group practice.

(c.) Join local Mental Health Associations.

(d.) Join Psychological Internet Services e.g., Academy of Medical Psychology; National Alliance Professional Psychology Providers (via Google).

State II

Government (A) Administrative (I)

(a.) Governor’s Executive functions

(b.) State Prisons and Private Prisons located within a State

(c.) State Hospitals and Private Hospitals operated within a State

(d.) Block Grants from the federal government, e.g., Social Security Title XX.

- (e.) Areas Health Education Cooperatives (AHECS)
- (f.) State Licensing Boards
- (g.) Medicaid
- (h.) Worker Compensation Commission
- (i.) Social Security Disability Determination State wide programs

State (II) Government (A) Legislative (2.)

- (a.) Medicaid
- (b.) Prescription Authority
- (c.) Scope of practice

State (II) Government (A) Judicial (3.)

- (a.) Forensic Psychology
- (b.) Mental health care in prisons, jails for inmates
- (c.) Insurance Claims

State (II) Private Sector (B) Business (1.)

- (a.) Corporate Employee Health Benefits and Employee Assistance Companies
- (b.) Union health benefit programs
- (c.) Private Prisons
- (d.) Specialty Programs for intercity, rural, elderly, retarded and other populations.

State (II) Private Sector (B) Consumer (2.)

- (a.) Advocacy Alliances with consumer groups, e.g., NAMI, Mental Health America
- (b.) American Legion, VFW, AMVets
- (c.) Good Will, Catholic Charities, Salvation Army
- (d.) Sports Related groups needing help for their athletes
- (e.) Disease related organizations, e.g., Alcoholics Anonymous, Heart Assn, Diabetes, Kidney, MS etc.
- (f.) Police and Firefighters member benefit associations

State (II) Private Sector (B) Professions (3.)

- (a.) Psychological Association, MFT, Counseling Assns.
- (b.) Hospital Association

(c.) Medical (MD), Medical (DO) Nursing, Social Work, Chiropractic Assns

(d.) Lawyer Associations

National (III) Government (A) Administration (1)

(a.) Coast Guard (US Public Health Service, Indian Health Service)

(b.) Department of Defense and military services. (Army, Navy, Air Force)

(c.) Surgeon General

(d.) Veterans Administration (Healthcare and Disability Benefits)

(e.) Department of Justice (Federal Bureau of Prisons)

(f.) Health and Human Services (Health Resource Services administration [HRSA])

(g.) Federal Emergency Management Administration FEMA (Disaster Relief)

(h.) FDA

(i.) Social Security Administration (Medicare, Medicaid, Disabilities, Welfare)

(j.) Department of Labor (Health Insurance Benefits)

National (III) Government (A) Legislation (2)

(a.) Definition of Psychologists as Physician in Medicare

(b.) Funding of Block Grants to States to Administer Federal programs within a State.

(c.) Funding of Graduate Medical Education and Internships

(d.) Definition of Psychology as a Health Profession

National (III) Government (A) Judicial (3.)

(a.) Rights of the Mentally Ill.

National (III) Non-Governmental (Private) (B) Business (1)

(a.) Joint Commission for the administration of Health Organizations (JCAHO)

(b.) Comprehensive Outpatient Rehabilitation Facilities

(d.) Private Prisons

(e.) Religious organizations with business affiliations e.g. St Vincent DePaul,
Salvation Army

National (III) Non-Governmental (Private) (B) Consumers (2)

(a.) Veterans Groups (American Legion, VFW, Am Vets)

(b.) Salvation Army; Shriners, Red Cross

(c.) Charitable Foundations (Religious and Special Purpose)

(d.) Health Related charities (Organ transplant groups)

National (III) Non-Governmental (Private) (B) Professional (3)

- (a.) Health Profession Related e.g., APA, APA, NASW, etc.
- (b.) Mental Health America (MHA), NAMI
- (c.) American Bar Association
- (d.) Association of State and Provincial Psychology Boards (ASPPB)

Psychologists Working in Hospitals Must Understand the Sea Changes Affecting Inpatient Care

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CMS has issued the Final rule tying hospital payments to quality and supervising the quality of care in hospitals in America. Previously, supervision was loose, dependent on data the hospital compiled, and dependent on very loose accreditation agencies. Now, with electronic records (EHR) and linked data systems available to the government a hospital can be evaluated on costs, quality measures that can be systemic or diagnostic group or practitioner related. For the first time in our history purchasing can be made on outcomes and productivity rather than marketing and brand identification. Capitalism and related market competition on price, quality, and availability and consumer satisfaction are being introduced into the healthcare industry.¹

The final rule issued on August 4 by the Center for Medicaid/Medicare Services (CMS) adopts requirements that limit payment for hospital acquired conditions (HACs) and readmissions. The rule, which updates Medicare payment policies and rates for inpatient stays at general acute care and long-term care hospitals (LTCHs) for FY 2015, builds on the administration's efforts for better hospital patient outcomes and slowing the long-term health care cost growth. Patients will be able to compare hospital costs for procedures and stay, doctor's batting averages, etc., and Accountable Care Organizations—ACOs charged with annual contracting competition on price, quality, and patient access and acceptance—will have this data to use in contracting and contract negotiations, price and quality pressure well-known in capitalistic markets. Healthcare systems and practitioners are not guaranteed a flow of patients and revenue as in the past fee for service system. ACOs with risk (they can lose money) will be pressed to purchase the best care under the federal guidelines and guarantees and to select provider organizations who are efficient, effective, and acceptable to the public. As the ACO moves us toward per patient/per month payments to selected organizations where patients signed with an ACO can get their care—instead of the fee for service system—I have cautioned psychologists that all patients (and associated revenue) will go through primary care centers and to start affiliating or joining these systems. Hospitals have seen this writing on the wall and have started purchasing primary care practices and expanding them. Survival as hospitalization is prevented in the ACA unless absolutely necessary.

The CMS rule also supports price transparency by reminding hospitals of the Affordable Care Act requirement to post or otherwise make their charges available to patients and the public. The public, under the ACA, can now compare insurance costs—in an apples to apples system—and hospital and doctor costs. This sets up the Capitalism requirement of “the informed consumer who votes with their feet/dollars”! I often laugh at the economically uneducated or uninformed that call the ACA “socialistic healthcare”! They clearly have fought to keep a healthcare system that has, but statute and rule, been insulated from Capitalism in so many ways!

The new rules further support the ACAs efforts to continue improving the care our Medicare beneficiaries receive while also cutting the growth of Medicare costs and preserving scarce

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resources and the viability of the Medicare system into the long time horizon. Recently, CMS published updated estimates that show that the ACA has already added several years to the Medicare funded viability.

CMS announced that the payment rate update to general acute care hospitals will be 1.4 percent in FY 2015. The rate update for long term care hospitals will be 0.9 percent. The difference in the update is accounted for by different statutory and regulatory provisions that apply to each system. The final rule also summarizes ideas received from stakeholders on an alternative payment methodology for short stay inpatient cases that also may be treated on an outpatient basis.

Improving Patient Care

The Hospital Value-Based Purchasing Program: The Hospital Value-Based Purchasing (VBP) Program established by the Affordable Care Act, adjusts payments to hospitals under the Inpatient Prospective Payment System (IPPS) based on the quality of care they furnish to patients. For FY 2015, as directed by the law, CMS is increasing the applicable percent reduction, the portion of Medicare payments available to fund the value-based incentive payments under the program, to 1.5 percent of the base operating diagnosis-related group (DRG) payment amounts to all participating hospitals. CMS estimates that the total amount available for value-based incentive payments in FY 2015 will be approximately \$1.4 billion.

Hospital Readmissions Reduction Program: The maximum reduction in payments under the Hospital Readmissions Reduction program will increase from 2 to 3 percent as required by law. For FY 2015, CMS will assess hospitals' readmissions penalties using five readmissions measures endorsed by the National Quality Forum. CMS estimates that hospital readmissions in Medicare declined by a total of 150,000 from January 2012 through December 2013. Hospitals that have a “virtual revolving door” have fleeced the system by artificially keeping their census (read as profit or fund balance) high by manipulating the volume with no incentive on “quality” and “linking” with appropriate aftercare (effective outpatient referrals and systems). Under the ACA, hospitals can improve their reimbursement by becoming effective in stabilization of the patient and linking the patient with appropriate aftercare to prevent future deterioration and hospitalization. This will really affect some of the hospital “cash cow diagnostic groups prone to over utilization of inpatient services,” including substance-abuse disorders, the mentally ill, co-occurring disorders that are medically non-compliant, and those who won't focus on life-style interventions. Clearly, hospitals will need psychologists to improve diagnoses, treatment planning, resistance dissipation, and linkage with Primary Care Centers that have psychologists who can provide appropriate care and treatment that prevents rapid re-hospitalization. Remember, ACOs, with skin in the game (financial risk), will also be putting pressure on contracted systems to improve their outpatient care and avoid high dollar inpatient care! There's lots in the ACA to plug this leaky hole in the bucket, and expose manipulative hospital chain maneuvers that have become classic in the hospital industry. There's a reason hospital administrators with bachelors degrees have traditionally had greater salaries than doctors!

The Hospital Acquired Condition Reduction Program: CMS is implementing the Affordable Care Act's Hospital Acquired Condition Reduction Program. Beginning in FY 2015, hospitals scoring in the top quartile for the rate of HACs—those with the poorest performance—will have their Medicare inpatient payments reduced by one percent. This program builds on the existing HAC program, currently saving approximately \$30 million annually by not providing additional Medicare payment for treatment of certain conditions that are reasonably preventable when those conditions are acquired after the beneficiary has been

admitted to the hospital for a different condition. This is another traditionally leaky hole in the bucket relative to hospitals and resources. Hospitals have repeatedly admitted some patients (I've seen as many as 25 admissions for a patient with the same minor things that can be treated in outpatient or home nursing care) with very poor follow-up, no case management (and the ACA is going to ramp up and pay for case management under health-care home programs and prevention programs), and really to the detriment of patient health. The system has been modified to "identify the resistant and uncooperative chronic and multi-diagnosis (high risk/frequent flyer) patient and to engage them to break down resistance and engage them. Again, a great opening for psychologists that our national associations have been scant to lobby for our specific inclusion in these laws and to prepare our workforce for how to access these positions and systems. It is a shame that psychological associations are still so focused on research on memory, diversity, and communication—all important in the long-time horizon—and so scantily organized and engaged in training our psychologist workforce to capitalize on these opportunities to serve the public health and elevate psychology in the primary care system! When I write the APA and discuss these things, and point out my publications in this regard dating to the late 1980s^{2,3,4,5}, they are silent, have no real or meaningful roll out program, and appear only marginally interested. This with an over \$100,000,000 annual budget and resources.

The Quality Reporting Programs: The rule's changes to Medicare quality incentive programs will continue to encourage high quality care while decreasing the time and effort it takes for providers to report the information. It will also align certain reporting requirements in both the Electronic Health Record (EHR) Incentive Program and the Hospital Inpatient Quality Reporting (IQR) Program. The final rule revises measures for the Hospital Inpatient Quality Reporting, LTCH Quality Reporting and PPS-Exempt Cancer Hospital Quality Reporting Programs. The Government will have the facts. They have used the ACA to link everything. They will be able to separate the efficient and effective from those who use their facility and practitioner licenses like a "little oil well" pumping out revenue with little effect! They will publish these data so that the ACOs can find the effective and efficient systems. And, they won't want to contract with 1500 private practitioners and take that costs, but will lean toward Hospital and Primary Care Delivery Systems with lots of providers to limit risk!

Wage Index – Updated Labor Market Areas: The law requires that Medicare adjust its inpatient hospital payment for area differences in the cost of labor—an adjustment known as the wage index. CMS is revising the labor market areas used for the wage index based on the most recent Office of Management and Budget (OMB) Core-Based Statistical Area delineations that are based on 2010 Census data. CMS is adopting a one-year transition during FY 2015 that would be based on a 50/50 blend of the former wage index and the new wage index so that the impact of the adjustment is moderated. The calculation will take effect in full in FY 2016.

Conclusions: The ACA is changing how hospitals receive pay, and in effect how all health-care will be reimbursed. The focus is on increasing competition, creating purchasing based on data bases that allow for suppliers to compete on efficiency and efficacy and consumers to make informed purchases. This will create price pressure downward, effective management of scarce resources, innovation and new firms entry into the markets, and effectively applies capitalistic theory to the healthcare industry. Many of us have written about the problems of quality and efficiency and the contribution the strict medical model has made to this situation^{6,7,8,9,10}. Still, psychological associations have done a poor job of recognizing the opportunities for psychologists and establishing required staffing of ade-

quate numbers of psychologists in the nation's facilities and adequate multi-disciplinary philosophies about healing and healthcare^{11,12}.

Psychologists must rush to affiliate with Primary Care Clinics and Hospitals, to establish a presence in Medicaid and Medicare systems (the universal care systems of the future), and must develop programs and services within the parameters of the ACA to help hospitals and primary care clinics comply and to increase their efficiency. This is a no-brainer, but the APA has no realistic workforce training and refinement and public education program to position psychologists for the new and evolving healthcare industry. The Academy of Medical Psychology, and the National Alliance of Professional Psychology Providers has led the way to clarify this reality, but gets no help from APA and its divisions and affiliates. This is a conundrum, since these two national organizations have repeatedly communicated with APA and have written books and ample journal and news literature and public education campaigns to help psychologists understand the coming change, and the threats and opportunities for psychologists!

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For more information:

- Final Rule: <https://www.federalregister.gov/articles/2014/08/22/2014-18545/medicare-program-hospital-inpatient-prospective-payment-systems-for-acute-care-hospitals-and-the>
- Fact Sheet: <http://cms.gov/Newsroom/MediaReleaseDatabase/Fact-sheets/2014-Fact-sheets-items/2014-08-04.html?DLPage=1&DLSort=0&DLSortDir=descending> FY 2015 Policy and Payment Changes for Inpatient Stays in Acute-Care Hospitals and Long-Term Care Hospitals
- Fact Sheet: <http://cms.gov/Newsroom/MediaReleaseDatabase/Fact-sheets/2014-Fact-sheets-items/2014-08-04.html?DLPage=1&DLSort=0&DLSortDir=descending> CMS to Improve Quality of Care during Hospital Inpatient Stays