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15.3.02

**Ayse Iscel**

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Dear **Ayse**,

I understand the deadline for submissions has been extended to April 2002.

This is my submission #6, titled

**EVIDENCE BASED SUSTAINABILITY ©**

**A submission based on Transcendental Meditation™ and  
AyurVeda scientific evidence of Sustainable Economic,  
Social and Environmental OUTCOMES, to reduce the cost of  
Government and bring benefits to all walks of life.**

Appendices **ABCDEFGHIJKL** accompany this submission.

**Also, Ayse, please can you pass a printed version  
of all this submission to the Premier as a personal  
communication to him from me, with a request to  
meet on this matter with me.**

Thanking you.

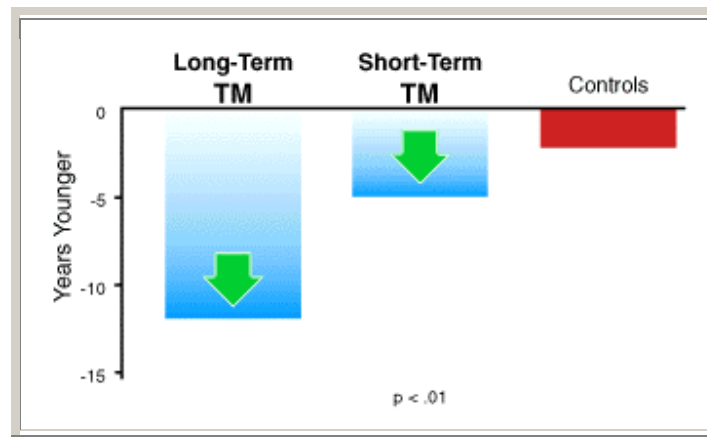
Regards,  
George P Kailis

## **APPENDIX A**

### **Brief Summary of Benefits of Ayur Veda Health Care**

**Refer [www.tmprogram.com.au](http://www.tmprogram.com.au)**

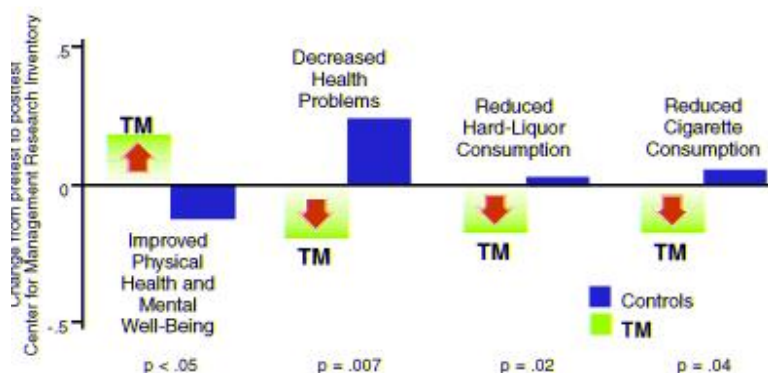
#### **1. Reversal of Aging**



Biological age measures how old a person is physiologically. As a group, long-term meditators who had been practicing Transcendental Meditation for more than 5 years were physiologically 12 years younger than their chronological age, as measured by reduction of blood pressure, and better near-point vision and auditory discrimination. Short-term meditators were physiologically 5 years younger than their chronological age. The study controlled for the effects of diet and exercise.

(The Effects of the Transcendental Meditation and TM-Sidhi program on the aging process, International Journal of Neuroscience 16 (1): 5358, 1982.)

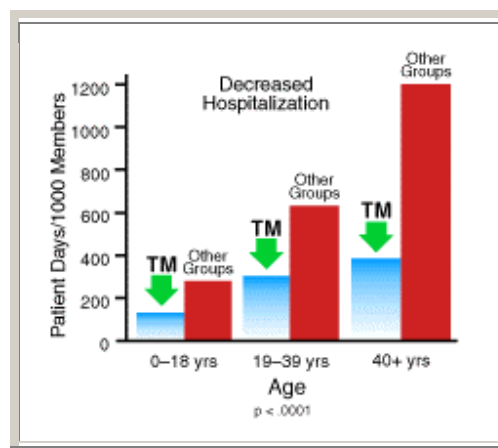
#### **2. Improved Health**



In 2 companies that introduced the Transcendental Meditation program, managers and employees who regularly practiced Transcendental Meditation improved significantly in overall physical health, mental well-being, and vitality when compared to control subjects with similar jobs in the same companies. Transcendental Meditation practitioners also reported significant reductions in health problems such as headaches and backaches, improved quality of sleep, and a significant reduction in the use of hard liquor and cigarettes, compared to personnel in control groups.

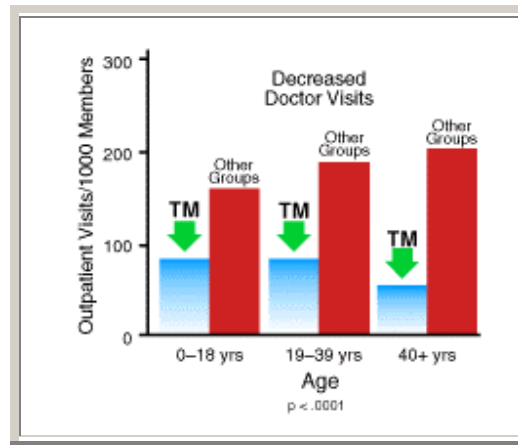
(A prospective study of the effects of the Transcendental Meditation program in two business settings, Anxiety, Stress and Coping; International Journal 6: 245262, 1993.)

### 3. Reduced Medical Care



A study of health insurance statistics on over 2,000 people practicing the Transcendental Meditation program over a 5-year period found that the Transcendental Meditation meditators consistently had less than half the hospitalisation than did other groups with comparable age, gender, profession, and insurance terms. The difference between the Transcendental Meditation and non-Transcendental Meditation groups increased in older-age brackets. In addition, the Transcendental Meditation meditators had fewer incidents of illness in 17 medical treatment categories, including 87% less hospitalisation for heart disease and 55% less for cancer.

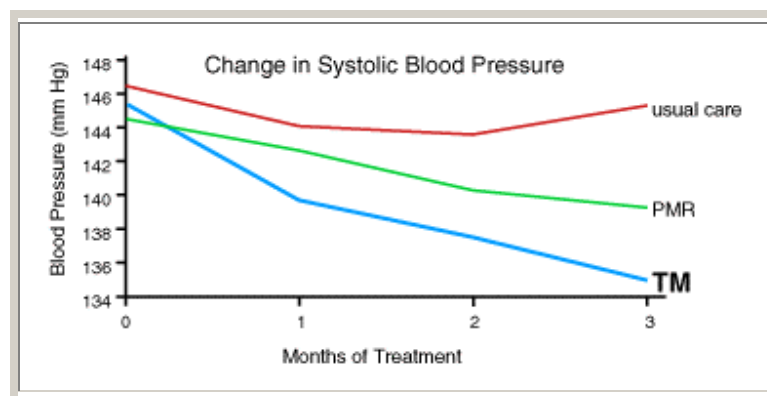
(Reference I: Medical care utilization and the Transcendental Meditation program, Psychosomatic Medicine 49: 493-507, 1987. Reference II: Reduced health care utilization in Transcendental Meditation practitioners, presented at the conference of the Society for Behavioral Medicine, Washington, D.C., March 22, 1987.)



A study of health insurance statistics on over 2,000 people practicing the Transcendental Meditation program over a 5-year period found that the Transcendental Meditation meditators consistently had more than 50% fewer doctor visits than did other groups with comparable age, gender, profession, and insurance terms. The difference between the Transcendental Meditation and non-Transcendental Meditation groups increased in older-age brackets.

(Reference I: Medical care utilization and the Transcendental Meditation program, *Psychosomatic Medicine* 49: 493-507, 1987. Reference II: Reduced health care utilization in Transcendental Meditation practitioners, presented at the conference of the Society for Behavioral Medicine, Washington, D.C., March 22, 1987.)

#### 4. Lower Blood Pressure

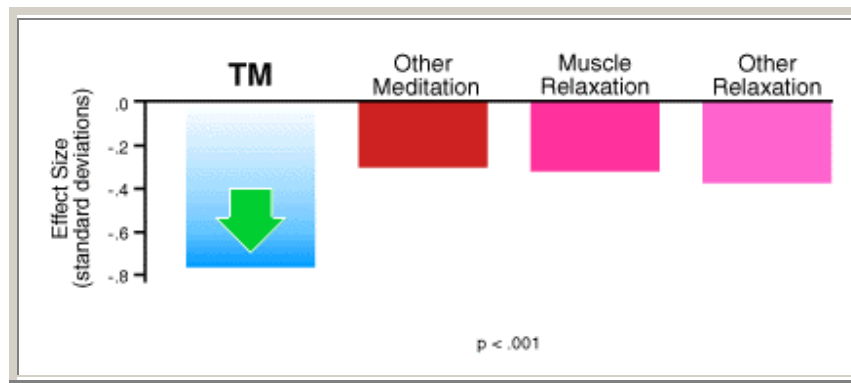


In a clinical experiment with elderly African Americans (mean age 66) dwelling in an inner-city community, Transcendental Meditation was compared with the most widely used method of producing physiological relaxation. Subjects who had moderately elevated blood pressure levels were randomly assigned Transcendental Meditation, Progressive Muscle Relaxation (PMR), or usual care. Over a 3-month interval, systolic and diastolic blood pressure dropped by 10.6 and 5.9 mm Hg, respectively, in the

Transcendental Meditation group, and 4.0 and 2.1. mm Hg in the PMR group, with virtually no change in the usual care group. A second random assignment study with the elderly conducted at Harvard found similar blood pressure changes produced by Transcendental Meditation over 3 months (11 mm Hg for systolic blood pressure).

(Reference I: In search of an optimal behavioral treatment for hypertension: A review and focus on Transcendental Meditation, chapter in *Personality, Elevated Blood Pressure, and Essential Hypertension* (Washington, D.C., Hemisphere Publishing, 1992). Reference II: Transcendental Meditation, mindfulness, and longevity: An experimental study with the elderly, *Journal of Personality and Social Psychology* 57(6): 950-964, 1989.)

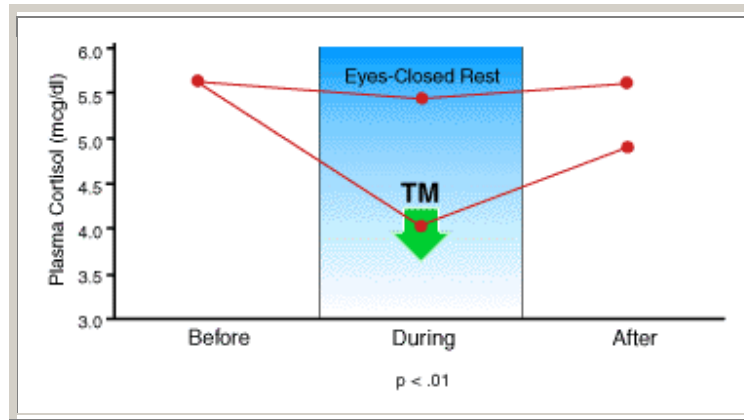
## 5. Reduced Anxiety



A statistical meta-analysis conducted at Stanford University of all available studies - 146 independent outcomes - indicated that the effect of the Transcendental Meditation program on reducing anxiety as a character trait was much greater than that of all other meditation and relaxation techniques, including muscle relaxation. This analysis also showed that the positive Transcendental Meditation result could not be attributed to subject expectation, experimenter bias, or quality of research design.

(Differential effects of relaxation techniques on trait anxiety: A meta-analysis, *Journal of Clinical Psychology* 45: 957-974, 1989.)

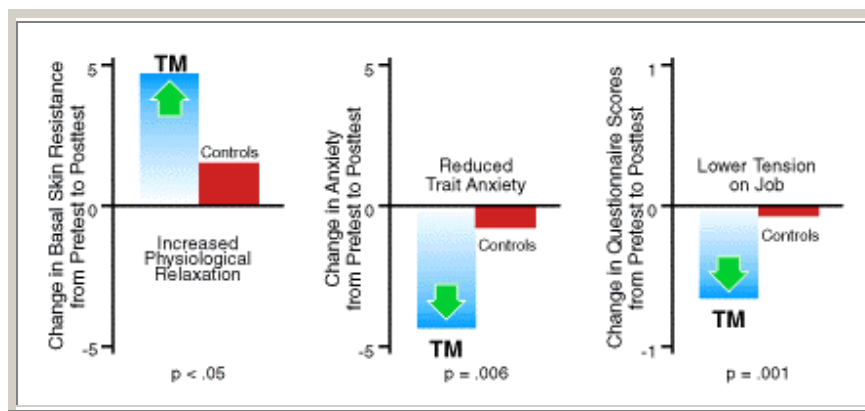
## 6. Decreased Stress



Plasma cortisol is a stress hormone. The study shows that plasma cortisol decreased during Transcendental Meditation, whereas it did not change significantly in control subjects during ordinary relaxation.

(Adrenocortical activity during meditation, *Hormones and Behavior* 10(1): 5460, 1978)

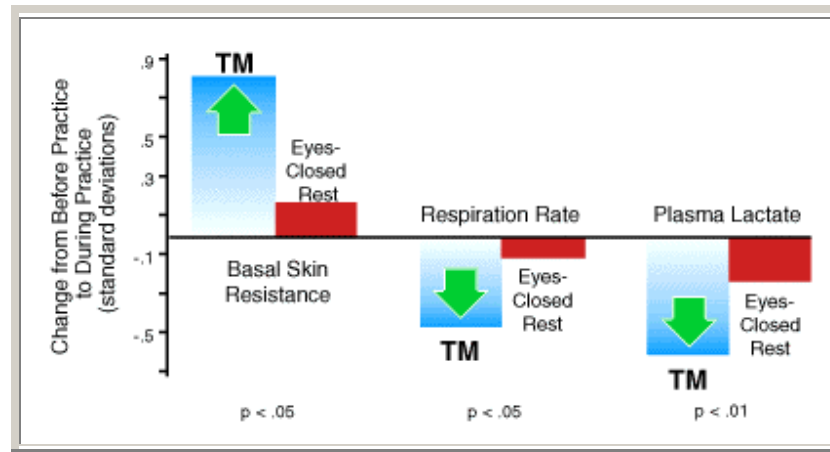
## 7. Increased Relaxation



This 3-month study of managers and employees who regularly practiced the Transcendental Meditation technique in a Fortune 100 manufacturing company and a smaller distribution-sales company showed that Transcendental Meditation practitioners displayed more relaxed physiological functioning, a greater reduction in anxiety, and reduced tension on the job, when compared to control subjects with similar job positions in the same companies.

(A prospective study of the effects of the Transcendental Meditation program in two business settings, *Anxiety, Stress and Coping: International Journal* 6: 245262, 1993.)

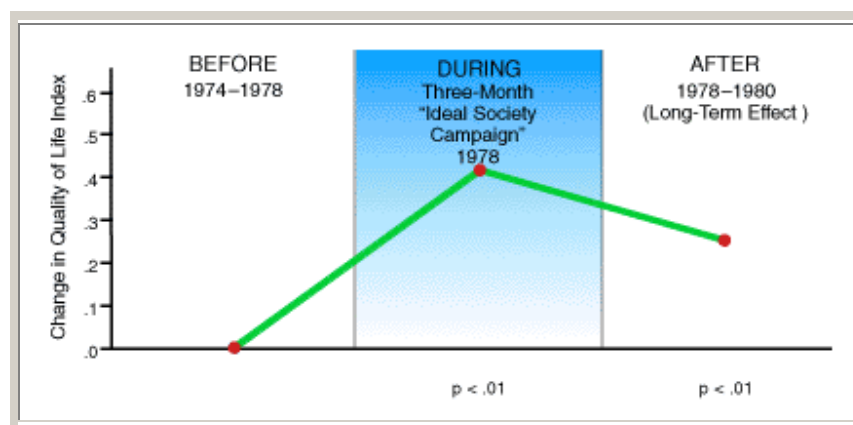
## 8. Deeper Rest



A meta-analysis, the preferred scientific procedure for drawing definitive conclusions from large bodies of research, found Transcendental Meditation produced a significant increase in basal skin resistance compared to eyes-closed rest, indicating profound relaxation. Deep rest and relaxation were also indicated by greater decreases in respiration rates and plasma lactate levels compared to ordinary rest. These physiological changes occur spontaneously as the mind effortlessly settles to the state of restful alertness, pure consciousness.

(Physiological differences between Transcendental Meditation and rest, American Psychologist 42: 879-881, 1987.)

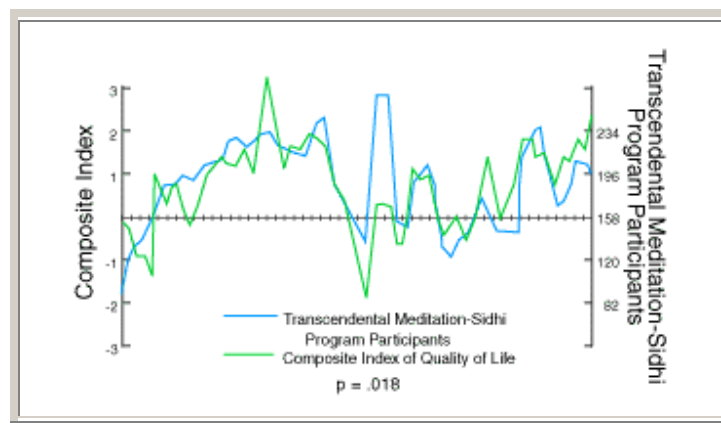
## 9. Improved Quality of Life



A prospective study was performed to assess the effects of the group practice of the Transcendental Meditation and TM-Sidhi program on the quality of life in Rhode Island. The number of TM-Sidhi program participants was sufficient to create the Maharishi Effect for the entire state. A time-series analysis was performed on a monthly index that assessed the quality of life in Rhode Island in comparison to a demographically matched

control state. During the experimental period, an index comprised of the following variables significantly decreased: crime, motor vehicle fatalities, auto accidents, deaths, alcoholic beverage and cigarette consumption, unemployment, and pollution. In the figure above, an increase illustrates an improvement in the index of all these variables taken together.

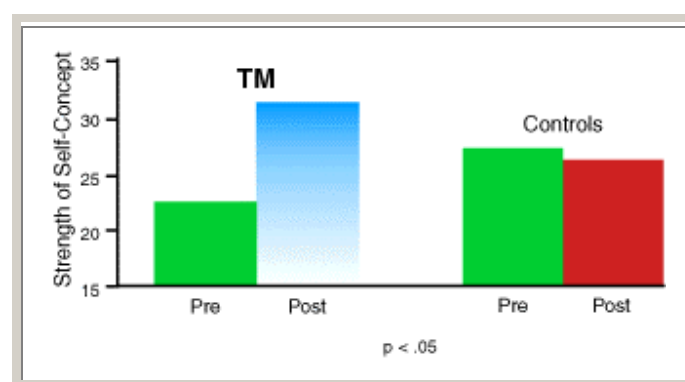
(Consciousness as a field: The Transcendental Meditation and TM-Sidhi program and changes in social indicators, The Journal of Mind and Behavior 8: 67103, 1987.)



This study indicates that group practice of the Transcendental Meditation and TM-Sidhi program improved the quality of life in Israel as measured by improvement on an index comprising crime rate, traffic accidents, fires, and the number of war deaths in Lebanon, and by increases in the national stock market and improvements in national mood. The chart above shows the strong correspondence between the number of Transcendental Meditation-Sidhi program participants in the group in Jerusalem and a composite index of all the above variables.

(International peace project in the Middle East: Effects of the Maharishi Technology of the Unified Field, Journal of Conflict Resolution 32: 776812, 1988.)

## 10. Increased Self-Concept

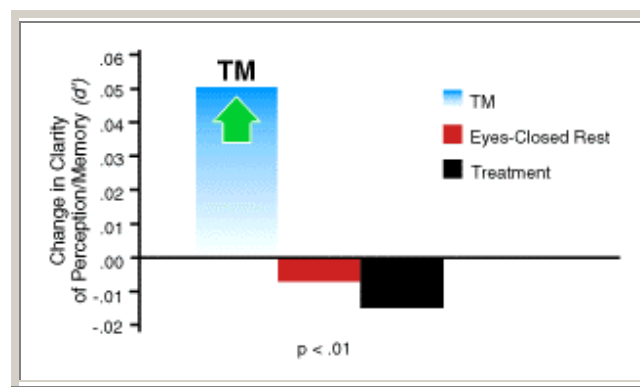




One month after beginning Transcendental Meditation, subjects experienced an improved self-concept in comparison to before learning the technique. Transcendental Meditation participants developed a more strongly defined self-concept and also came to perceive their "actual self" as significantly closer to their "ideal self." No similar changes were observed for matched controls.

(Reference I: Effects of Transcendental Meditation on self-identity indices and personality, British Journal of Psychology 73: 5768, 1982. Reference II: Psychological research on the effects of the Transcendental Meditation technique on a number of personality variables, Gedrag: Tijdschrift voor Psychologie (Behavior: Journal of Psychology) 4: 206218, 1976.)

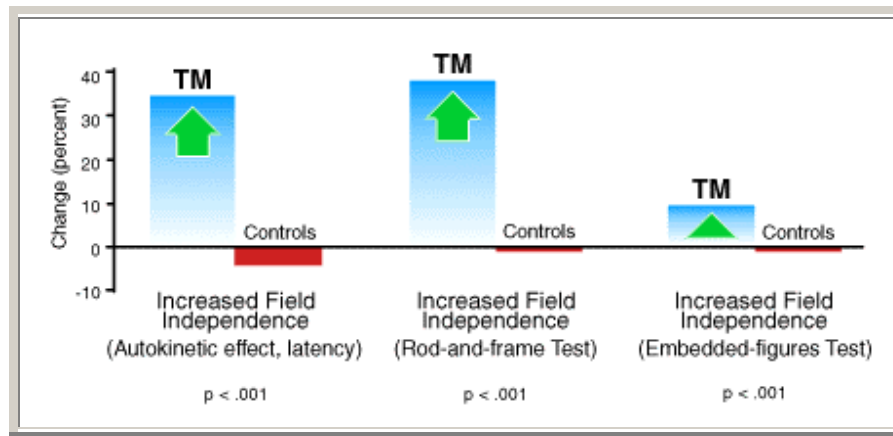
## 11. Improved Perception



College students instructed in Transcendental Meditation displayed significant improvements in performance over a 2-week period on a perceptual and short-term memory test involving the identification of familiar letter sequences presented rapidly. They were compared with subjects randomly assigned to a routine of twice- daily rest with eyes closed, and with subjects who made no change in their daily routine.

(Meditation and flexibility of visual perception and verbal problem solving, Memory and Cognition 10: 207215, 1982.)

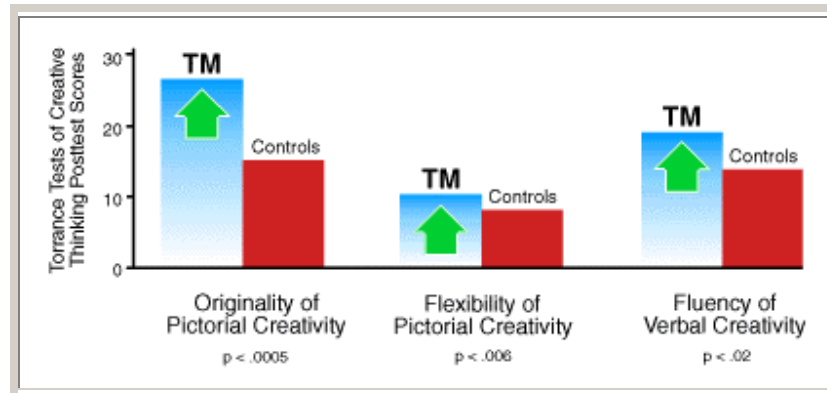
## 12. Broader Comprehension



Field independence has been associated with a greater ability to assimilate and structure experience, greater organization of mind and cognitive clarity, improved memory, greater creative expression, and a stable internal frame of reference. The results show that practice of the Transcendental Meditation technique develops greater field independence. This improvement in Transcendental Meditation meditators is remarkable because it was previously thought that these basic perceptual abilities do not improve beyond early adulthood.

(Reference I: Influence of Transcendental Meditation upon autokinetic perception, *Perceptual Motor Skills* 39: 1 031-1034, 1974. Reference II: Longitudinal effects of the Transcendental Meditation and TM-Sidhi program on cognitive ability and cognitive style, *Perceptual and Motor Skills* 62: 731 738, 1986.)

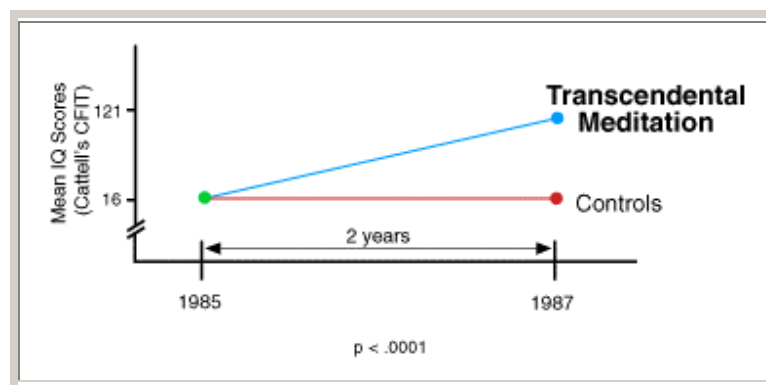
## 13. Increased Creativity



This study used the Torrance Tests of Creative Thinking to measure figural and verbal creativity in a control group and in a group that subsequently learned the Transcendental Meditation technique. On the post-test 5 months later, the Transcendental Meditation group scored significantly higher on figural originality and flexibility and on verbal fluency.

(Reference I: The TM technique and creativity: A longitudinal study of Cornell University undergraduates, *Journal of Creative Behavior* 13: 169-190, 1979. Reference II: A psychological investigation into the source of the effect of the Transcendental Meditation technique, (Ph.D. dissertation, York University) *Dissertations Abstracts International* 38, 7-B: 33723373, 1978.)

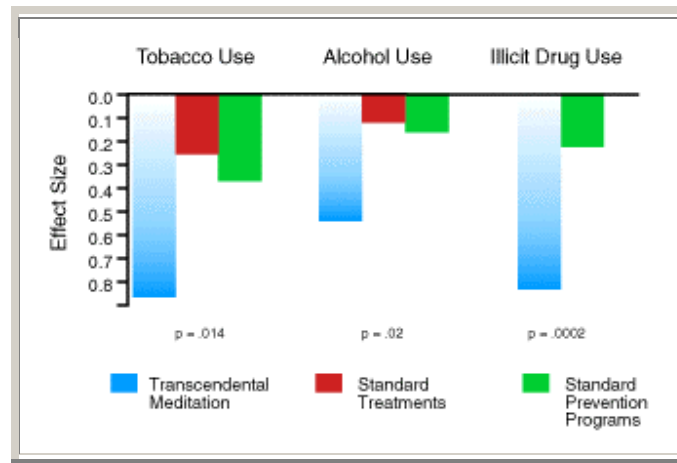
## 14. Intelligence Growth



Students at Maharishi International University in Fairfield, Iowa, who regularly practiced Transcendental Meditation, increased significantly in intelligence over a 2-year period, compared to control subjects from another Iowa university. This finding corroborates the results of two other studies showing increased IQ in Maharishi International University students.

(Reference I: Transcendental Meditation and improved performance on intelligence-related measures: A longitudinal study, *Personality and Individual Differences* 12: 1105-1116, 1991. Reference II: Longitudinal effects of the Transcendental Meditation and TM-Sidhi program on cognitive ability and cognitive style, *Perceptual and Motor Skills* 62: 731738, 1986.)

## 15. Decreased Drug Abuse



A statistical meta-analysis of 198 independent treatment outcomes found that Transcendental Meditation produced a significantly larger reduction in tobacco, alcohol, and illicit drug use than either standard substance abuse treatments (including counselling, pharmacological treatments, relaxation training, and twelve-step programs) or prevention programs (such as programs to counteract peer-pressure and promote personal development). This meta-analysis controlled for strength of study design and included both heavy and casual users. Whereas the effects of conventional programs typically decrease sharply by 3 months, effects of Transcendental Meditation on total abstinence from tobacco, alcohol, and illicit drug ranged from 51% to 89% over an 18 to 22 month period.

(Reference I: Treating and preventing alcohol, nicotine, and drug abuse through Transcendental Meditation: A review and statistical meta-analysis, *Alcoholism Treatment Quarterly* 11: 13-87, 1994. Reference II: Effectiveness of the Transcendental Meditation program in preventing and treating substance misuse: A review, *International Journal of the Addictions* 26: 293-325, 1991.)

## **APPENDIX B**

**Herron, R.E. (1993). The impact of Transcendental Meditation practice on medical expenditures.**

***Dissertation Abstracts International*, 53, 4219A.**

Herron took his data on Canadian citizens and obtained it from the Canadian Government. Because Canada has a cradle to the grave health care coverage, the government has data

On every health care expenditure incurred by every citizen. It was possible to trace people's records back years before they learned TM, then look for any changes that occurred as they learned and continued to meditate.

The study was also significant because it tracked not just health care utilization, but actual health costs as well.

Skyrocketing health care costs pose a severe threat to economic viability.

Prior to this study, no research project had found a program that could reduce health care costs long term. Some programs help contain costs- helped to keep the upward spiral of prices from increasing so rapidly. But nothing had ever brought costs down on a **SUSTAINABLE** basis.

The situation has now changed. All of the research on TM has been summed up in dollars & cents. Herron found that, in the years before they learned TM, the subjects' health care costs

averaged the same for all people in their age range. They were not a self-selected group of outstandingly healthy people. Once they began to meditate, however, their health care costs began to decline – an average Of 10% each year.

The reductions were the most dramatic among people who had previously shown the highest pattern of health care costs. The total group was divided into thirds, and in the third which had been to doctors and the hospital most frequently, the practice of TM reduced health care costs by 18% a year – 54% in 3 years.

Among the elderly, the decline was slightly greater, 19% a year, 57% in 3 years. These declines are inflation adjusted. Since health care costs were rising rapidly each year, the actual cost savings were considerably greater.

## **APPENDIX C**

**Reference: Orme-Johnson D. Medical Care Utilisation and the Transcendental Meditation™ Programme. Psychosomatic Medicine, 1987, 49:493-507**

Transcendental Meditation™ practitioners need significantly less medical care than the general population, according to a study conducted in the United States. The five year study, on the use of medical care, was performed in the by Dr Orme-Johnson in co-operation with a health insurance company. The medical care required by 2,000 practitioners of Transcendental Meditation™ was compared with that of 600,000 non-meditating members of the same insurance company. Over the five years the medical care use by people practising Transcendental Meditation™ was found to be considerably less than that of the non-meditating group. These findings were considered highly significant: in other words, the possibility that they occurred merely by chance was extremely low.

## APPENDIX D

### How the Transcendental Meditation Program (TM) Differs from Other Techniques

#### Dr. Nancy Lonsdorf

Author of A Women's Best Medicine and Medical Director of the Maharishi AyurVeda Center, Washington, DC

Many of my patients today tell me that they already practice some form of meditation or relaxation. When I recommend that they learn and begin to practice the TM technique they logically wonder why.

There are several issues to address in answering this question. The most important is that of benefits. Comparison studies have consistently shown that TM yields two or more times the beneficial effect for a number of health conditions including hypertension, anxiety, substance abuse, and overall mental health as compared to other techniques (1-5). Also, significantly greater effects have been found for TM for increasing longevity and reducing cardiovascular mortality and mortality from all causes (6,7).

Many people are surprised to learn that different techniques of meditation yield different results. This is largely due to the fact that soon after the first studies on the physiological effects of meditation in Westerners (studies done on the Transcendental Meditation Program), were published over 25 years ago, it was hypothesised that all other techniques of meditation and relaxation would also produce similar states of reduced sympathetic arousal and therefore all should be equally effective. This hypothetical physiological response was termed "the relaxation response" (8). Although this concept enjoyed widespread popularity and acceptance for some years, the hypothesis was never substantiated by comparative data on different techniques. Today scientists are taking a critical look at the "relaxation response" hypothesis. A growing body of research now points to exactly the opposite conclusion than the "relaxation response" hypothesis predicts. That is, different methods of meditation and relaxation result in distinctly different physiological changes during the practice and to different types of benefits in daily life (9,10). The details of how various techniques differ with regard to physiological effects will be considered in a later section (see page 6).

This review will consider three main ways in which the TM technique differs from other types of meditation and relaxation:

- (1) Health benefits
- (2) Physiological effects
- (3) Mental technique

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## **I. Health Benefits**

### **Anxiety**

A study published in the Journal of Clinical Psychology in November 1989 reviewed all the available studies on meditation or relaxation techniques for reducing trait (ie. chronic) anxiety (2). The range of techniques included Transcendental Meditation, progressive muscle relaxation, Benson's technique, concentration, Sanskrit mantra meditation, EMG biofeedback and placebo techniques. Transcendental Meditation was the only technique that showed an effect greater than placebo. All other techniques were equal to or less effective than placebo, except TM which measured an effect size which was nearly twice that of any other technique. Notably, meditation that involved concentration lead to an increase in anxiety; further emphasising that all meditation techniques do not yield the same results.

### **High Blood Pressure**

In a study published in the November 1996 issue of Hypertension (the official journal of the American Heart Association,) Transcendental Meditation was demonstrated to be equally effective as prescription drugs for lowering high blood pressure (1). The study which randomly assigned 127 older African-American patients to either TM, progressive muscle relaxation (PMR) or standard diet and exercise found that TM was twice as effective at lowering high blood pressure as progressive muscle relaxation. This evidence convinced the NIH to fund two multimillion dollar long-term follow-up studies, the results of which will be published in the coming years.

At this time, the TM technique is the only cognitive-behavioural technique that has been demonstrated to be clinically effective against high blood pressure. In 1993, David Eisenberg of Harvard University published a review article which found that no study published from 1970 to 1991 had demonstrated effectiveness of any meditation, biofeedback or relaxation technique at lowering blood pressure beyond placebo (11). This analysis did not include studies on Transcendental Meditation.

### **Mental Health**

A meta-analysis comparing the effect sizes for various meditation and relaxation techniques for overall self-actualisation, a measure of psychological maturity, health and development described by Abraham Maslow as the peak state of personal development. The TM technique was over twice as effective at increasing self-actualisation scores over several months of practice. In addition, longer periods of regular practice were associated with larger effect sizes\* with TM (average 0.77) relative to the other techniques (average 0.37,) strengthening



the validity of the findings and suggesting that the TM technique has a cumulative beneficial effect (4).

(\*Please note: Effect size measures the difference in means at post test between experimental and control conditions in standard deviation units, (typically adjusting statistically for differences between groups at pretest. In the behavioural sciences, an effect size of 0,80 standard deviation units is considered large, while 0.5 suggests a medium effect, and 0.2 a small effect)

### **Substance Abuse**

Comparative studies on the effects of meditation and relaxation techniques on the reduction of substance abuse clearly demonstrates that not only is TM three to four times as effective as other relaxation techniques in reducing alcohol abuse, but TM is also more effective by 50%-60% as compared with standard preventive education programs, driving under the influence programs and preventive programs counteracting peer influence (3).

In the best controlled TM studies, abstinence rates for alcohol, cigarettes, and illicit drugs ranged from 51%-89% over an 18-24 month period as compared to abstinence rates of 25%-35% for standard treatment programs after only 12 months. This maintenance of abstinence at high rates up to two years later are in sharp contrast to conventional rehabilitation programs which typically experience a precipitous drop off in abstinence rates in the first three months after completion of the program.

### **A Comparison Study in the Elderly**

A Harvard University study (6) of 77 elderly nursing home residents compared three types of meditation and relaxation techniques on a wide range of variables including blood pressure and mortality rate. The residents were randomly assigned either a no-treatment control group or one of three techniques which included TM, "mindfulness training" (training in active distinction-making designed to stimulate mental flexibility and creativity,) and "mental relaxation," essentially the Benson's technique involving silent repetition of a sound, verse or phrase which the subject found pleasant, coupled with a passive attitude.

After three years, the TM group was found to have the greatest reduction in measures of stress and in blood pressure, and was the only group in which no one died during the study, although the average mortality during those three years for all residents was over 33%. Results at follow-up 8 years later found that the initial results were maintained. After 8 years, the TM groups mean survival time was 65% higher than that of the other groups combined, and after 15 years it was still 22% higher (7).

(Please note: Interestingly, the "mental relaxation" group (Benson's technique) had the highest mortality rate and highest blood pressure and the least improvement in mental health: ie. their results in survival rate and blood pressure

were worse than the no-treatment control group. While one might think that the "relaxation" induced by both TM and the mental relaxation technique would lead to similar benefits outside meditation, this was not the case. While both groups felt "relaxed" during and after practice of their respective techniques, the TM group rated the highest overall benefits in cognitive function and health of all three groups, including the "active," non-relaxing mindfulness training group. Moreover, whereas the active mindfulness subjects reported feeling less relaxed during and after their practice, they nevertheless experienced benefits in health and cognition similar to though less marked, as the TM group. These findings argue against the hypothesis that seemingly similar techniques will yield similar effects.)

### **Overall Health Benefits of TM**

The most broad-based evidence for the health benefits of TM lies in health care utilisation data collected by insurance companies. The first study, published in *Psychosomatic Medicine* in 1987, tracked 2000 people across the US who practiced TM and compared their health care utilisation with that of a group matched for age, education, profession and other variables. The overall result showed that the TM group went to the hospital 56% less often than controls, and needed 50% fewer doctor's visits (12).

A further study has demonstrated that this effect is not due to the possibility that TM practitioners are somehow a healthier group before they begin to meditate. This study published in the *American Journal of Health Promotion* in 1996 compared health care costs for 677 enrollees in the Quebec provincial health care plan for three years before and three years after learning TM. This study found that prior to learning TM, the subjects health care costs were the same as other people their own age. They were not a self-selected group of healthy people.

After learning TM, however, their health care costs began to drop an average of 5-7% each year. The largest declines were found in those who had previously shown the highest pattern of health care costs. For these highest utilisers of health care, TM reduced costs by 18% each year, with a total drop in expenditures of 54% at the end of three years (13).

### **Reduced Aging**

#### **Younger Biological Age**

Several studies indicate that regular practice of the TM technique is associated with younger biological age. Wallace et al. found that TM practitioners had on average significantly better near vision, blood pressure and hearing than non-TM controls. The validity of this association is strengthened by the fact that those meditating for the most years had the most dramatic reduction in biological age. TM practitioners meditating for less than five years measured five years younger in biological age as measured by blood pressure, hearing and near vision, and those practicing for over five years measured 12 years younger (14).

### **Higher DHEAS Levels**

DHEAS is a hormone produced by the adrenal gland whose levels are higher in youth, declining gradually over the lifetime. Higher levels are associated with reduced incidence of a variety of diseases including cardiovascular disease, osteoporosis and breast cancer. A study published in the Journal of Behavioural Medicine (15) compared DHEAS levels in TM practitioners with a matched control group. The TM practitioners averaged up to 50% higher levels for their age group as compared to controls. These higher levels of DHEAS in TM meditators imply a younger biological age.

### **Greater Longevity and Higher Survival Rates**

As described in the comparison study of the elderly above, the random assignment, controlled nursing home study indicates that the reduced aging effects of TM are not due simply to self-selection, (ie. individuals who learn TM are not biologically younger or predisposed to reduced aging before they start TM.) The nursing home residents who practiced TM had a much longer survival rate in the 8 years of the study, and had lower blood pressure and reduced cardiovascular disease than in the mindfulness training, mental relaxation and no-treatment comparison groups (6,7).

### **How Practice of the TM technique May Result in These Profound Health Benefits** (A Look at Mechanisms)

#### **Reduced Free Radicals in TM Meditators**

One mechanism that may play a role in the reduction in aging effect of the TM program is reduced free radical generation. Free radicals are unstable, highly reactive molecules that damage cellular components including the DNA, and are felt to play a major role in the aging process as well as most diseases including cardiovascular disease and cancer. A recent study found that levels of lipid peroxide (a measure of free radical levels in the blood) are significantly lower (by approximately 15 %) in TM practitioners as compared to controls matched for diet and locale (16).

#### **Higher DHEAS Levels**

As noted above, DHEAS (dihydroepiandrosterone sulfate) is an adrenal hormone whose levels were found in an observational study involving hundreds of TM subjects and controls to be significantly higher in both male and female TM subjects across age groups. Since higher DHEAS levels are associated with reduced rates of breast and ovarian cancer, high cholesterol, and cardiovascular disease, higher DHEAS levels in TM subjects may help explain reduced incidence of cancer and heart disease in TM meditators (12,17).

#### **Lower Serum Cholesterol**

Another possible mechanism by which the TM Program lowers the risk of cardiovascular disease is through lowered cholesterol levels (18). Lower

cholesterol coupled with lower blood pressure (19), less nicotine abuse, lower free radical levels, lower cortisol levels and higher DHEA all may contribute to the lower incidence of cardiovascular disease found in TM meditators (12).

### **Reduced Stress Hormone Levels (i.e. Lower Serum Cortisol)**

Another possible mechanism may be the reduced effect of stress as measured by levels of serum cortisol in TM practitioners. The detailed mechanisms by which stress leads to poor health are as yet not well understood. However, animal studies suggest that chronic stress leads to increased base-line levels of serum cortisol (commonly known as the "stress hormone,") and lowered cortisol response to acute stressors. It is suspected that this pattern of stress response, a high baseline level of chronic stress associated with a reduced hormonal coping response to sudden stressors, may lead to increased susceptibility to disease.

The effects of the Transcendental Meditation technique versus a stress education class on measures of cortisol were assessed in 49 subjects who were randomly assigned to either intervention. The study (20) found that baseline cortisol levels went down significantly in the TM over the four months of the study, while cortisol response to acute stressors increased in the TM group as compared to the stress education group. Overall, the study suggests that repeated practice of the TM technique reverses effects of chronic stress to a degree significant for health.

High levels of cortisol in the plasma induce enzymes in the liver which reduce blood levels of precursors necessary for the production of neurotransmitters including serotonin and epinephrine. Reduced levels of these neurotransmitters along with high cortisol levels have been found in depression, panic disorder, alcoholism and anorexia nervosa and may generally result in lowered immunity.

The fact that regular practice of the Transcendental Meditation program leads to levels of these neurochemicals changing in the opposite direction from these health conditions, i.e. with TM, cortisol level drops (20) and serotonin increases (21), implies that this may be an important neuroendocrine mechanism by which the TM technique improves mental and physical health and reduces ageing.

### **Faster Physiological Recovery after Stress**

Other studies have demonstrated that physiological recovery after acute stressors is also more rapid in practitioners of the TM technique, providing another mechanism by which the effects of stress are reduced by the practice (22, 23.)

## **II. Physiological Effects**

Different Techniques Have Different Physiological Effects

As popular as it has been to assume that all techniques of meditation yield the

same effects, it is indeed more logical and consistent with current research in mind-body medicine to expect that different mental processes will yield different physiological effects. For example, we know that specific emotions create distinct physiological effects both immediately and longterm, if that emotion becomes a dominant experience in that person's life. For example, the mental state of anger is associated with reduced blood flow to the heart, impaired cardiac function (24) and increased cardiovascular disease (25) whereas feeling socially supported can lead to reduced death rates for a variety of conditions, including cancer progression (26). Various types of meditation, relaxation and contemplative prayer involve different types of mental activity and can therefore be expected to activate the brain and body as a whole in unique patterns, thereby giving varying ranges of effects.

A recent review of 175 studies and 25 reviews concluded that the type of effect a given approach creates is related to the goal and methodology of that approach (9). For example, biofeedback usually effects the specific bodily system it addresses. EMG biofeedback (electromyographic or muscle tension biofeedback) results in reduction in muscle tension, whereas blood pressure biofeedback results in reduced blood pressure, and finger-temperature biofeedback leads to changes in peripheral circulation. Moreover, addressing the same bodily system by two different techniques may result in different effects on that system. For example, EMG biofeedback usually results in reduced tension in the particular muscles utilized in the training, whereas progressive muscle relaxation (which utilises a technique of tensing and releasing several major muscle groups) results in more generalised muscle relaxation throughout the body.

**A Uniform "Relaxation Response" is Not Supported by Scientific Research**  
Twenty five years of research on meditation and relaxation techniques completed since the "relaxation response" was first proposed has demonstrated that there is no uniform physiological response common to all techniques, i.e. the "relaxation response" hypothesis has not withstood the test of scientific scrutiny (9,10). The TM program, Benson's technique, as well as a variety of other mental techniques including hypnosis, progressive muscle relaxation, yoga Asanas, Zen, Zazen, mindfulness concentration, autogenic training and various types of meditative prayer from Eastern and Western traditions produce a varying patterns of physiological changes, not all of which are in the direction of relaxation ( some are in the direction of greater somatic arousal,) and which differ among techniques regarding degree of changes and direction of changes (27,28,29).

In addition as we have seen in the previous section, the degree and range of benefits varies greatly from one technique to another. It is worth pointing out that there remains today a relative paucity of data on the physiological effects and health effects of many of these techniques, certainly insufficient to have concluded in the first place that they produce any specific, common "relaxation

response" in the body.

## **Physiological Effects of the Transcendental Meditation Technique**

### **TM Versus Eyes Closed Rest**

The physiological effects of the TM technique have been characterised far more extensively than any other technique in the scientific literature. The most common question considered is, "How does TM differ from just sitting with eyes closed and resting?" In summary, research on the effects during TM show changes, but not all, in the direction of relaxation. TM itself does not produce a uniform "relaxation response." Rather, the physiological findings point to a state of "restful alertness" in which some parts of the body are obtaining deep rest, while other areas, such as the brain, are more alert. This state of "restful alertness" elicited by the Transcendental Meditation technique was shown in a recent study to induce a lower respiratory rate than simple rest (indicating reduced metabolic rate and increased rest), lower plasma lactate (indicating reduced metabolic rate,) and higher basal skin resistance (indicating more stable functioning of the autonomic nervous system.) The study concluded that Transcendental Meditation produces a unique pattern of physiological relaxation, clearly deeper than during simple eyes-closed resting (30).

#### **TM Produces a Unique Physiological State**

Not only are the physiological changes during TM greater than during eyes closed resting, but there are physiological changes during TM which are completely unique and not found during ordinary rest.

First of all, blood withdrawn during TM showed reduced red blood cell metabolism (31). This is a highly unusual finding, since red blood cell metabolism ordinarily remains constant 24 hours a day, not even slowing down during sleep. This indicates a profound and unique state of rest is achieved in the body during TM.

Secondly, sophisticated measurements of metabolism and blood flow have shown that metabolism of the arm muscles drops significantly during TM and not during eyes closed rest (32), indicating relaxation of the skeletal musculature. In addition, during TM blood flow to the arms and legs, as well as to internal organs such as the liver, decreases markedly (33), whereas during ordinary rest blood flow to the liver increases.

This finding created a puzzle to researchers initially, since blood flow to the arms, legs and internal organs decreased during TM, yet heart rate and presumably also cardiac output remained constant. Where was all the blood flow going? This question was answered when blood flow to the brain was next measured. It was found that blood flow to the brain increases markedly during TM as compared to eyes closed rest (34). Blood is preferentially shunted to the brain during TM, indicating a deep state of rest in the body, but a state of dramatically increased blood flow to the central nervous system.

This finding of increased cerebral blood flow implies that something extraordinary

is occurring with brain function during TM. Indeed, brain wave patterns during TM include periods of increased alpha wave activity (35), an indicator of a relaxed state of awareness. However, brain wave changes during TM are not simply limited to increased alpha production, which can also be seen with ordinary relaxation or biofeedback. The most significant brain-wave marker of Transcendental Meditation involves the overall pattern of brain waves.

Brain waves coming from different areas of the brain are normally generated independently and therefore come without any temporal association between the wave forms. However, during TM, brain waves coming from different parts of the brain, particularly the frontal regions (which control judgement and planning,) and the central regions (controlling sensory input and action) develop "stable phase relations," a type of synchrony termed "coherence." This particular pattern of brain wave coherence (frontal and central) had never previously been seen (35,36,37,38). This pattern has been found to be associated with greater creativity (39) and more efficient reflexes.

Technically, this was measured by Fourier analysis of the brain waves, a mathematical measurement. If the resulting sine waves attained correlations of over 0.95, they were counted as being "coherent," or as having stable phase relations.

### **TM Produces a Unique State of Consciousness; The Fourth State of Consciousness**

On the basis of these and other research findings, many researchers view the Transcendental Meditation technique as presenting a completely new style of physiological functioning. This style of functioning in the body occurs because the mind during TM correspondingly is experiencing a completely new style of functioning, or "state of consciousness."

It is well known that during the three common states of consciousness- waking, dreaming and sleeping- the body functions in three completely different ways. For every state of consciousness there is a distinctly different state of physiological functioning.

The Transcendental Meditation technique produces a unique physiological state (see references cited above) characterised in certain respects by deep relaxation: reduced muscle and red blood cell metabolism, more stable nervous system functioning, reduced levels of cortisol (the stress hormone," reduced plasma lactate and reduced breath rate. Yet at the same time, blood flow to the brain increases in a highly distinctive way and a unique pattern of coherence between the frontal and central parts of the brain occurs. Overall this pattern of functioning is completely different from the patterns seen in waking, sleeping and dreaming, and has not been demonstrated to date by simple relaxation or by any other systematic mental technique (40,41).

### **III. Mental Process during the Technique**



## **How TM differs in the Nature of the Mental Technique Itself**

### **TM is Effortless and Natural**

The Transcendental Meditation technique is a simple, standardised mental technique which is practiced silently for twenty minutes twice daily while sitting comfortably with eyes closed. The TM technique takes advantage of a natural tendency of the mind to settle down to quieter, more subtle and charming states of experience. During the practice of the TM technique, the mind spontaneously experiences quieter and more subtle states of the thinking process until it experiences the completely silent, "ground" state of the mind that underlies all thinking and creative processes. This state is one of complete inner restfulness, yet alertness. The mind experiences itself as pure awareness, pure wakefulness, awareness awake to itself (42). Rather than being lost in a thought or an emotion, as in our usual waking state of consciousness, the mind is awake to the silent inner level that underlies all more active states of the mind. This restfully alert fourth state of consciousness gained during TM allows the mind to truly rest and experience its own inner silent, unbounded nature.

### **TM is Deeply Restful to Mind and Body**

This experience is extremely rejuvenating to the mind and body. Because mind and body are intimately connected, (every mental state has corresponding physiological state) when the mind gains this deep state of rest, the body also gains deep rest. With this deep rest the body's homeostatic and healing mechanisms are strengthened, resulting in reduced stress and better health.

Other Techniques Generally Involve Concentration or Contemplation

Most if not all other techniques of meditation involve either contemplation (thinking about something,) or concentration (focusing attention on a word, sound, phrase or visual stimulus.) Because these techniques involve an active thinking process, they tend to hold the mind on the surface, active level of thinking and impede to lesser or greater degree the process of progressive refinement of thought or "transcending."

### **The Most Natural, Effortless Technique Will Yield the Greatest Benefits: "Nature is the Healer"**

According to this understanding, the degree to which techniques elicit refinement and settling of the thought process will determine the degree of rest, rebalancing and healing that occur in the mind and body as a result of the practice. While many techniques, including placebos, might elicit this general healing mechanism to some degree, comparison studies showing more significant physiological changes and greater health benefits with TM support the conclusion that the Transcendental Meditation technique is the most direct and efficient methodology for eliciting this overall balancing response.

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## **APPENDIX E**

Refer [www.webmd.com](http://www.webmd.com)

By Tinker Ready

(WebMD) -- Now that he's hit middle age, Lawson English is entering the heart-disease zone. Because he's overweight and only moderately active, the Tucson, Arizona, computer programmer is a prime candidate for problems. Factor in his family history of heart disease, and his odds of developing ticker trouble climb even higher.

But English says that, at the age of 44, his cholesterol levels, blood pressure and heart rate are perfectly normal. "My blood pressure and heart rate are so low that my doctor doesn't even bother to admonish me to lose weight," he says.

He may just be lucky of course, but English attributes his good heart health to his long-time devotion to transcendental meditation (TM), a practice popularized in the 1970s by the Maharishi Mahesh Yogi and the Beatles. Twice a day, TM devotees like English find a quiet place, sit comfortably and focus their minds on a single word, or mantra. For 15 to 45 minutes, they enter a state of conscious relaxation often described as "restful alertness."

### **Matters of the heart**

When English took up the practice in the 1970s, he had no idea that it might stave off heart disease. Neither did anyone else. But over the past few years, impressive evidence that TM can reduce heart disease risk factors has been published in mainstream medical journals. The latest finding, published in the March 3, 2000 issue of the American Heart Association's journal *Stroke*, found that African-Americans who practiced TM two times per day for seven months reduced the amount of fatty deposits in their arteries, as measured by ultrasound. The study was the first to look specifically at TM and atherosclerosis, or hardening of the arteries.

What's more, previous studies have shown that TM can lower blood pressure, another major risk factor for heart disease. In 1995, for instance, the same group of researchers published a study in the journal *Hypertension* reporting that middle-aged and elderly African-Americans using transcendental meditation lowered their blood pressure more than those who adopted tried-and-true lifestyle changes such as diet and exercise programs. (These studies, which the authors describe as preliminary, focused on African-Americans because of their high risk for hypertension.)

In other articles published around that time, researchers reported that people

practicing TM had lower blood levels of stress-related biochemicals, including serotonin and adrenaline, and were much less likely to be hospitalized for heart problems.

Although the Hypertension studies did not look at exactly how TM improves cardiac health, one of the lead investigators has a theory. Dr. Robert Schneider of the College of Maharishi Vedic Medicine in Fairfield, Iowa, says that TM "may trigger self-repair mechanisms in the body."

### **'Medicate and meditate'**

The fact that this research was conducted by researchers at the Maharishi College might be expected to raise eyebrows in the mainstream scientific community. But the studies, says Dr. Richard Stein, American Heart Association spokesman and cardiologist, "seem to be done honorably."

In fact, when Schneider's study came out, the AHA distributed a press release recommending that "People with high blood pressure may want to medicate and meditate." And Stein adds that people whose blood pressure is just beginning to rise into the danger zone might be able to avoid going on medication by practicing TM. That's good news for people who can't tolerate side effects, like drowsiness, that come with some high blood pressure medication. "There is no downside to relaxation techniques," Stein says.

Until recently, anyone who wanted to try an alternative approach to health care had to rely on folk wisdom and anecdotal evidence. University of Michigan cardiac surgeon Dr. Steven Bolling, who is conducting a study of "qigong," a Chinese "energy healing" technique, thinks doctors will be more comfortable trying these approaches now that researchers are beginning to publish the results of well-designed clinical trials in prestigious journals.

Grant-makers at the National Institutes of Health (NIH) think the TM findings are intriguing enough to merit further attention. In September 1999, the NIH's National Center for Complimentary and Alternative Medicine gave the Maharishi center a \$7.5 million grant to study cardiovascular disease and African-Americans. New studies will examine just what TM does to the circulatory system that decreases atherosclerosis.

Schneider thinks that meditation and some other forms of alternative medicine will eventually become a routine option for patients trying to dodge heart disease. Meditation's New Age patina shouldn't scare off people who might want to try it, Schneider says. The practice requires no adherence to any religious philosophy and can be performed without spending hours in the lotus position. "We found that TM is easy to learn," he says. "It's 15 or 20 minutes twice a day."

As for Lawson, the latest findings are simply one more reason to continue the

practice that has been a part of his everyday life for the past 25 years. "I didn't learn TM for my heart," he says. "But I think it has made a difference."

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## **APPENDIX F**

### **Study: Transcendental Meditation Technique Lowers Health Costs**

[From THE REVIEW, Vol. 15, #17, June 21, 2000  
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<http://www.mum.edu/TheReview>]

By Christine Schrum

Findings from a faculty study published in the current issue of the **AMERICAN JOURNAL OF HEALTH PROMOTION** show that people who practice the Transcendental Meditation® technique are healthier and need less medical care--a dramatic finding which could save U.S. health insurance companies billions of dollars each year.

The study of Quebec citizens enrolled in the government health insurance program showed that over a six-year period those practicing the Transcendental Meditation technique reduced government payments to physicians by 13 percent each year compared to a control group. This translates into a savings of as much as \$300 million per year for the province's health insurance company.

"This is a significant finding for Canada, and one that could help reduce the soaring health care costs in the U.S. as well," says Robert Herron, Ph.D., lead author of the study and associate professor of health economics and policy at Maharishi University of Management. He said that a 13 percent decline in costs would translate into a \$4–5 billion savings for U.S. health insurance companies.

The Quebec study involved a total of 2,836 people from the province enrolled in the government's health insurance program. Of these, 1,418 were volunteers who had been practicing the Transcendental Meditation technique for an average of six years, and 1,418 were controls of the same age, sex, and region who were randomly selected by the Regie de l'assurance-maladie du Quebec (RAMQ).

Using data provided by RAMQ, Dr. Herron and associates first established a baseline by going back 14 years and gathering information on the total amount of money paid to physicians for this group. Adjustments for inflation were made using the medical cost component of the Canadian government's Consumer Price Index

(CPI). The scientists were able to determine a typical subject's rate of change in expenditure over the period using robust statistics.

Researchers found that before starting meditation, the yearly rate of increase in payments between the Transcendental Meditation group and the control group was not significant. However, after learning meditation, the Transcendental Meditation group's mean payments declined 1 to 2 percent each year, while the control group's mean payments increased up to 12 percent annually over six years. Thus, there was a mean annual difference between the two groups of about 13 percent.

Dr. Herron says over 70 percent of illnesses arise from preventable causes. "Moreover, physicians know that 80 to 90 percent of all illnesses are caused and complicated by stress. Research has shown that the Transcendental Meditation technique is a highly effective stress-reducing program."

For more information, please contact Dr. Herron at [rherron@mum.edu](mailto:rherron@mum.edu).

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## **APPENDIX G**

20 September 2000

### **THE IMPACT OF THE TRANSCENDENTAL MEDITATION PROGRAM ON GOVERNMENT PAYMENTS TO PHYSICIANS IN QUEBEC: AN UPDATE**

### **ACCUMULATIVE DECLINE OF 55% OVER A 6-YEAR PERIOD**

By Robert E. Herron, Ph.D. and Stephen L. Hillis, Ph.D.

#### **ABSTRACT**

**Purpose:** To determine whether practice of the Transcendental Meditation (TM) technique can affect medical expenses.

**Design:** Quasi-experimental, longitudinal, cost-minimization evaluation.

**Setting:** Province of Quebec, Canada.

**Subjects:** 1,418 Quebec health insurance enrollees who practiced the TM technique were compared with 1,418 subjects who were randomly selected from enrollees of the same age, sex, and region. TM subjects had chosen to begin the technique prior to learning about and choosing to enter the study.

**Measures:** This 14-year, pre- and post-intervention study retrospectively assessed government payments to physicians for

treating the TM and comparison groups. Other medical expense data for individuals were unavailable. Data were inflation-adjusted. For each subject, least squares regression slopes were calculated to estimate pre- and post-intervention annual rates of change in payments. We compared the groups' means and 1%, 5%, and 10% trimmed means (robust estimators) of the slopes.

Results: Before starting meditation, the yearly rate of increase in payments between groups was not significantly different ( $P > 0.17$ ). After commencing meditation, the TM group's mean payments declined 1-2% annually. The comparison group's payments increased up to 11.73% annually over 6 years. There was a 13.78% mean annual difference ( $P = 0.0017$ ).

Conclusions. The results suggest the TM technique reduced payments to physicians between 5% to 13% annually relative to comparison subjects over 6 years. Randomized studies are recommended.

Key Words: Health Care Costs, Stress Reduction, Meditation, Physician Utilization.

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## INTRODUCTION

The United States, Canada, and most other nations are experiencing an epidemic of chronic stress and unhealthy behaviors, including cigarette smoking, improper diet, lack of exercise, and substance abuse. Together these factors are major contributors to the morbidity, mortality, and medical costs for heart disease, cancer, and stroke.<sup>1-3</sup> Although over 70% of diseases are

from preventable causes, less than 1% of total health expenditures were spent on prevention in the United States as recently as 1988.<sup>4,5</sup> When health promotion and disease prevention budgets are this limited, and when the potential for improved national health is so great, it would be desirable to identify preventive methods that can reduce medical expenses. High medical expenditures are a major concern in virtually every nation.

Stress reduction may help because many unhealthy behaviors are associated with long-term stress.<sup>6,7</sup> Chronic stress, or excessive activation of the stress response, also leads to high levels of cortisol, other neuromodulators, and free radicals that weaken the immune system and increase vulnerability to chronic and immune-related diseases, including cardiovascular disease and cancer.<sup>8-12</sup> Theoretically, stress-elimination should strengthen the immune system and enhance physical and mental health, improve unhealthy stress-related behaviors, and thereby decrease medical costs.

Although the economic justification for health promotion and disease prevention has not been conclusively demonstrated, there is a considerable amount of research that suggests improved lifestyles will enhance health and reduce medical expenses. For instance, a fifteen-year epidemiological study of middle-aged men found that lifestyle-related factors are important to long-term survival.<sup>13</sup> Some research also suggests that chronic stress can affect both health outcomes and medical expenses. A retrospective analysis of 46,026 employees found evidence that subjects who were experiencing depression (often a stress-related disorder) or high stress were 70% and 46%, respectively, more likely to incur high medical costs than those without these problems.<sup>14</sup> Several randomized trials, observational studies, and meta-analyses indicate the Transcendental Meditation (TM) technique improves unhealthy behaviors<sup>6,7,15-24</sup> by not only reducing stress,<sup>17,18</sup> but also by producing more orderly functioning of the brain.<sup>25-28</sup>

Brain function is clinically important because it directly or indirectly governs most bodily functions.

Our previous evaluation analyzed the data of 677 practitioners of the TM technique.<sup>29</sup> There was no separate control group; thus we could not determine whether the changes were caused by the TM practice or some other factor. Using several estimators, in the prior study we found that during the three years before starting the TM program, the adjusted payments to physicians for treating the subjects did not change significantly ( $P > 0.05$ ). After commencing the TM practice, subjects' adjusted expenses declined significantly ( $P < 0.05$ ). The several methods used to assess the rate of decline in payments gave estimates ranging from 5% to 7% annually.<sup>29</sup>

This present evaluation expands and extends our previous study (1) by including data not previously available on 741 additional subjects for a total of 1,418 subjects, (2) by adding a comparison subject for each TM subject; and (3) by extending the study to cover three additional years.

The purpose of the present analysis was to determine whether government medical payments in Quebec were affected by the practice of the Transcendental Meditation technique. Since over 590 studies have previously examined the TM technique's impact on numerous health, lifestyle, physiological, psychological, and other outcomes,<sup>15-28,30</sup> the sole purpose of this study was to assess whether this procedure can contribute to minimizing medical expenditures. This study was not designed to elucidate the causal mechanisms of how the intervention reduces medical expenses. Furthermore, this study was conducted neither to explore nor to document the relationships among TM practice, actual health status, perceived health status, lifestyles, socioeconomic levels, self-efficacy, race, gender, age, ethnicity, medical beliefs, job satisfaction, and economic variables. The hypothesis is that the practice of this procedure will decrease medical expenses, as measured by payments to private physicians

in all treatment settings. Payments to medical doctors are approximately 20% of total annual medical spending in Canada and the United States. Measurement of these expenses may provide important information, because doctors' decisions determine most other medical expenditures, e.g., hospitalization, prescription medication, and medical testing.

It is particularly appropriate to study the impact of stress reduction methods on payments to physicians in Quebec. Past research in Quebec has found a significant link between psychological distress and physician utilization.<sup>31</sup> Such relationships may also exist in other populations, especially in highly stressed nations such as the United States.

## METHODS

### Design

This quasi-experimental, retrospective, longitudinal, pre- and post-intervention study compared 14 years of government payments to physicians for treating two groups—a sample of 1,418 Quebec health insurance enrollees who practiced the TM technique and 1,418 comparison subjects who did not practice this procedure. Permission to conduct this study was obtained from the Régie de l'assurance-maladie du Québec (RAMQ), the government health insurance agency for the province of Quebec.

### Sample

TM Group: 1,418 Quebec citizens who practiced the Transcendental Meditation technique were included in the study. A TM practitioner was defined as a person who had learned the Transcendental Meditation technique in the standard seven-step course taught by the Quebec TM program organization (see

Intervention below). Recruitment of subjects occurred between September 1990 and September 1992. Participants were solicited by distributing questionnaires to Transcendental Meditation program practitioners who attended events at the Montreal TM Center and by mailing questionnaires to TM program practitioners throughout the province. No financial or other material incentives were provided to encourage response or participation in the study. These solicitations yielded a total of 1,756 returned questionnaires. Of the returned questionnaires 1,418 were both legible and complete enough to use. All subjects who had learned the TM technique were included in this intent-to-treat analysis (regardless of their indicated regularity of practice). The TM subjects had practiced the technique for various lengths of time, with an average of 6.7 years, which is too long a practice period to suggest similarities with the general population.<sup>32</sup>

The TM group is a nonprobabilistic, or convenience sample, because: (1) the TM subjects self-selected to practice the TM technique and later self-selected into the study, (2) the number of questionnaires distributed was not recorded systematically, and (3) the number of possible respondents was indefinite. This method of sampling limits the generalizability of the TM group's results. This limitation, while serious, was considered acceptable in that this ongoing project is the only long-term, longitudinal study to assess the medical costs of individuals who practice the TM technique. As such this study can be considered preliminary in nature. To improve the design, future randomized research should consider the addition of an active control group of committed practitioners of some other relaxation technique, diet, or exercise program.

Comparison Group: The comparison group in this study is a probabilistic sample, because it was randomly selected by an independent organization, the Quebec health insurance agency. For each TM subject, RAMQ randomly selected one comparison subject from its database of all Quebec enrollees having the same age, sex, and region of habitation. There were a total of 2,836

subjects in both groups (1,408 males, 1,428 females; average age: 38 years). The TM subjects' occupations were widely distributed across all job categories, suggesting even distribution among all socioeconomic levels.

## Measures

The dependent variable in this study was annual payments to private physicians for treating the subjects in all settings. This study measures the payments to both general practitioners and specialists. The services provided by private physicians in hospitals was also measured in this study. The independent variable was meditation status: NonTM subjects or TM practitioners. In 1971 the Canadian provinces began providing health insurance plans that cover all medically necessary physician and hospital care. All citizens are entitled to full, free physician and hospital services for all types of necessary medical care. There were no exclusions or dollar limits during the years of this study. Since the citizens of Quebec are all covered by the same insurance policy and have equal access to care, this uniformity facilitates more accurate measurement of physician expenditures than in the United States.

In Quebec, the price of physician services is determined by periodic negotiations between the Quebec government and the doctors' organization that licenses physicians, oversees continuing medical education, and also functions like a labor union. Prices are set periodically for each physician service in each region of the province. In this provincial medical system, market forces do not interact to affect price. However, governmental guidelines, incentives, and regulations have attempted to restrain unnecessary use of doctors' services. Yet, physicians retain ultimate control over treatment and subsequent expenditures. In Canada, the Royal College of Physicians and Surgeons has standardized medical

education, role of specialties, and treatment. This standardization helps to reduce practice variability, which is comparatively wide in the US. Canadian doctors have more authority, professional autonomy, and control than those in the US. Canadian physicians' decisions are not questioned or challenged by utilization review boards, insurance companies, or government regulators as in the United States.

Data on TM subjects were collected using a one-page questionnaire that explained the study and asked each subject for several items of information: (1) medical insurance number (which enabled RAMQ to retrieve the subject's physician payment records), (2) date of Transcendental Meditation instruction (which enabled us to determine the subjects' pre- and post-intervention periods), (3) present occupation, (4) level of regularity in practicing the technique (regular, irregular, or stopped), and (5) age and sex.

RAMQ has maintained centralized database records of its payments to private physicians from 1981 onwards, and RAMQ gave to us the total annual payments to physicians (both general practitioners and specialists) for providing all forms of medically appropriate treatment to each of the 2,836 subjects from 1981 to 1994 in all treatment settings. Other medical expenditure data, such as nonphysician hospital charges, medical tests, and drug costs, were unavailable for individual subjects in the RAMQ database. RAMQ has provided data for many other studies similar to the present one.<sup>31</sup>

## Intervention

The Transcendental Meditation technique of Maharishi Mahesh Yogi is a standardized procedure practiced for 15 to 20 minutes twice daily while sitting comfortably with eyes closed. The TM



technique is the primary treatment and health promotion intervention of Maharishi Vedic Approach to HealthSM (MVAH), a comprehensive natural health care system based on the traditional Ayur-Vedic medical system of India. Maharishi Mahesh Yogi, in collaboration with leading physicians, has restored Ayur-Veda according to the knowledge recorded in the ancient texts; this revived version of Ayur-Veda is called Maharishi Vedic Approach to Health. MVAH is prevention-oriented and has the goal of maintaining and restoring balance (e.g., reduction of free radicals, cortisol, lactate, and hypertension) in the physiology to achieve optimal health. The most widely researched MVAH methodology is the Transcendental Meditation program, which has been shown to be highly effective for reducing stress, re-establishing homeostasis, and activating the restorative mechanisms of the body (e.g., improve brain function and reverse effects of aging and chronic illness).<sup>6,7,15-28</sup> We have of no way of knowing how closely the study subjects followed the instructions for the procedure.

## Analysis

To make all years (1981-1994) of data comparable, the subjects' annual physician expenses were adjusted for inflation using the medical cost component of the Canadian government's Consumer Price Index (CPI). This CPI was provided by Statistics Canada at its website, <http://www.statcan.ca>. All data in this study were analyzed and presented in constant 1992 Canadian dollars.

Our objectives were to estimate the mean annual change in payments to physicians in dollars, to evaluate the significance of this change, and to estimate the magnitude of this change as a percentage. To accomplish these goals, each subject's pre- and post-intervention, annual, inflation-adjusted expenses were regressed on time using a simple linear least squares model. The

resulting slope was used to estimate the subject's rate of change in expenditures per year, in 1992 Canadian dollars. The average year for the TM subjects' starting the intervention was 1988. For estimating the annual rate of change before the intervention for the NonTM group, the time period consisted of the years 1981-1986. For the NonTM group, 1987-1994 was the post-intervention period with 1987 as the base year for the linear least squares regression calculation. For estimating the annual rate of change before the intervention for the TM group, the time period consisted of 1981 to the year before TM practice commenced. The year immediately before the start of TM practice to all subsequent years for which expense data were available was the period for estimating the post-intervention annual rate of change for the TM subjects.

To protect the confidentiality of the subjects' data in both groups, RAMQ removed all information that could link the annual physician payments they provided with a specific person. With annual physician expense data, RAMQ provided only information on group membership (TM or NonTM), sex, general age category, and the year that TM subjects began the intervention. Thus, we could not ascertain which NonTM subject matched a specific TM subject; this constrained our analysis to compare groups by general categories.

As is typical for medical cost data, the distribution of slopes in pre- and post- intervention periods for both groups was nonnormal with heavy tails.<sup>33,34</sup> In data with a heavy-tailed distribution such as these, the usual mean is not a robust estimator, because means are easily affected by a few extreme cases.<sup>33-36</sup>

Thus, in analyzing the slopes, we included three estimators in addition to the mean, namely the 1%, 5%, and 10% trimmed means, which are more robust than the mean. The 1% trimmed mean is the mean of the slopes after the largest 1% and the smallest 1% of the slopes have been omitted. Similarly, the 5%

and 10% trimmed means are the means after omitting the largest and smallest 5% and 10%, respectively, of the slopes. Trimmed means are less sensitive to outliers than the mean and have smaller standard errors for heavy-tailed distributions. The 1%, 5%, and 10% trimmed means provide estimates of the means for the middle 98%, middle 90%, and middle 80% of the population values, which should be fairly close to the population mean because the slope distributions are approximately symmetric.<sup>35,36</sup>

If the practice of the TM program had no effect, then one would expect the estimated average annual change in expenditures to be nonsignificantly different between the two groups in the post-intervention period. On the other hand, a significant decline in the TM group compared with the NonTM group during the post-intervention period would support the hypothesis that the Transcendental Meditation technique reduced the use of conventional medical care and related expenditures. During the pre-and post-TM periods, the confidence intervals and hypotheses tests of the 1%, 5%, and 10% trimmed means of the inflation-adjusted annual changes in payments to physicians for the two groups were performed using the two-sample, trimmed t-statistic. In these calculations, we used an adaptation of Welch's degrees of freedom formula, described by Yuen.<sup>37</sup> These calculations were made using S-PLUS for Windows, Version 3.2 (1994, MathSoft, Inc.).

The regular means were compared using the independent t-test without the assumption of equal variances with SYSTAT 5.2 (1992, SPSS Inc., Chicago, IL). The P-values for the means and trimmed means are two-sided with  $\alpha = 0.05$ . All confidence intervals were calculated at the 95% level.

For the means and trimmed means, we also calculated estimates of the high and low annual rates of change in inflation-adjusted expenses as percentages for the pre- and post-intervention periods.

Medians were calculated for the annual payments for all 2,836 subjects in each year from 1981 through 1994. The high and low estimates of the annual rates of change percentages were calculated by dividing the estimated annual change in expenses by the highest annual median (\$92.14) and the lowest annual median (\$61.03) for all subjects from 1981 through 1994, respectively.

## RESULTS

Table 1 shows the means and trimmed means that estimate the annual rate of change in payments to physicians for treating the subjects in both groups for the pre- and post-intervention periods. These changes are expressed both as 1992 Canadian dollars and as percentages.

### Pre-Intervention

Before starting the TM technique, the mean and trimmed mean estimates of annual rate of change in physician payments were nonsignificantly different between the two groups. For both groups, all estimators showed increased annual expenses, and there was not a significant difference between the two groups, as shown in Table 1. The increasing physician payments for both groups was typical for this period in Quebec due to increased utilization of physicians' services. In Quebec, between 1982 and 1992, there was a major increase in payments to specialists, especially for treating the elderly.<sup>38</sup> General practitioners also started providing more expensive services than in previous years.<sup>38,39</sup> The TM group was higher at baseline than the NonTM group. This nonsignificant difference may suggest that some of the TM practitioners had health problems, and they may have used the intervention as self-care.

## Post-Intervention

During the post-intervention period, the NonTM group's estimated annual physician payments increased to higher levels than in the pre-intervention period. In contrast, the TM group's physician payments appear to have decreased annually. All estimators showed this phenomena and all post-TM differences were significant as shown in Table 1. Overall, these data suggest that a major change had occurred in the TM group in which the trend of escalation in physician expenses was reversed.

## DISCUSSION

### Summary

The results supported the hypothesis. When compared with NonTM subjects in the post-intervention period, the practitioners of the Transcendental Meditation technique showed a mean annual reduction of almost 14% in payments to physicians over an average of six years. These results are supported by similar findings in a previous eleven-year, cross-sectional study of Blue Cross and Blue Shield enrollees in the US in which TM subjects incurred total medical expenditures that were approximately 60% below the levels for comparison subjects and norms.<sup>40,41</sup>

### Limitations

This quasi-experimental study has limitations that affect the interpretation of results.<sup>42</sup> The sampling method for the TM group affects the external validity or generalizability of the results to wider populations.<sup>42</sup> The sample selection protocol and lack of response rate data disallows our concluding that the study subjects are representative of all TM practitioners. No records were kept on the number of people who attended events or received

questionnaires at the Montreal TM Program Center. Also, accurate records were not kept on the number of people who were mailed questionnaires. The concern is self-selection. Subjects chose to start and continue practice of the TM technique, and also chose to enter the study. Those who entered the study may not be representative of all those who begin the technique, and those who chose to begin it may not be representative of the general population or the NonTM group.

Since no follow-up assessment of adherence to the intervention's protocol was made, we do not know what level of compliance the subjects may have had. All subjects who learned the TM technique in the standardized course were included in this study and analyzed on an intent-to-treat basis (i.e., all 1,418 subjects from whom legible questionnaires were received were evaluated regardless of their degree of compliance with the intervention's protocol). Thus, the results seem conservative, because we may have underestimated the actual effect of the TM technique on medical expenditure reduction. The effect of the procedure and the power of the study might have been reduced to the degree that subjects may have failed to comply with the protocol.<sup>43</sup> For most research designs, including randomized clinical trials, the intent-to-treat analysis is preferred to evaluation based on compliance, which is often difficult to measure accurately and reliably.<sup>44, 45</sup>

It is possible the TM group increased significantly more than comparison subjects their use of other positive health procedures. In this study, there was no attempt to monitor possible concurrent changes in lifestyle, diet, exercise, tobacco use, alcohol or drug use, other health-related habits, and attitudes about medical care usage that may have accompanied the subjects' decision to start the Transcendental Meditation program. However, it may be relevant that other research indicates TM practice can decrease unhealthy habits. <sup>6,7,15-24</sup>

Alternative explanations for the results, such as the placebo effect, must be considered.<sup>46</sup> In a meta-analysis of 146 independent outcomes, Eppley found the TM technique was significantly more efficacious than a placebo or other relaxation techniques.<sup>18</sup> Moreover, several studies showing positive effects of the TM technique on hypertension<sup>15-17</sup> and psychological health<sup>17,18,20,23,47</sup> have used prospective, random assignment designs that included both placebo and active control groups. Thus, the placebo effect seems an unlikely explanation for the results.

Another possible explanation could be that the TM subjects increased more than comparison subjects their use of other unconventional care, complementary/alternative medicine (CAM), which was not monitored in this study. Although approximately 14% of the Quebec population uses some form of CAM,<sup>48</sup> the Quebec government keeps records only of the subjects' utilization of standard physician treatment, because RAMQ pays only for conventional care and not for CAM. From Table 1, we see that before starting the technique, the TM group's use of conventional physician care was increasing faster than that for the NonTM group. However, upon commencing the technique, TM subjects may have discontinued their conventional care, and started utilizing more complementary/alternative medicine than comparison subjects. However this explanation appears unlikely for several reasons.

First, Eisenberg et al.,<sup>49,50</sup> Astin,<sup>51</sup> Druss and Rosenheck,<sup>52</sup> and Paramore<sup>53</sup> provide evidence from national surveys suggesting that unconventional medical care is generally used to supplement or complement conventional medical treatment, and not to replace it. Druss and Rosenheck<sup>52</sup> explained "unconventional therapies appear to serve more as a complement than an alternative to conventional medicine." Astin<sup>51</sup> found that 95.6% of his sample

used alternative care to complement their conventional treatment, and only 4.4% used CAM as primary care.

Second, past research indicates that users of unconventional medicine are more likely to have higher physician utilization than the rest of the population. Druss and Rosenheck<sup>52</sup> found that "Overall, having any visit for unconventional therapies was associated with an approximately 2-fold increase in the odds of having a physician visit." They also found that for those who practice some form of meditation, there was a 1.45 odds ratio (CI, 0.88-2.49;  $p < .001$ ) for increased visits to conventional physicians.<sup>52</sup> Paramore<sup>53</sup> found that "users of alternative care made almost twice as many visits to conventional (or orthodox) medical providers as nonusers made." In Canada, users of CAM tend to have more chronic illnesses than the general population,<sup>48,54</sup> which usually leads to higher physician utilization rates.

However, the meditators in this study showed the opposite trend in physician use. What might explain this difference? Recent meta-analyses have indicated that different relaxation methods produce widely differing results.<sup>17</sup> There could be many reasons why the TM practice is associated with decreased physician utilization ranging from improved actual health status<sup>15-17</sup> to reduced anxiety,<sup>18</sup> which affects perceived health status, another determinate of medical care use. TM practice also strengthens self-efficacy,<sup>47</sup> which could also influence utilization rates. However, it was beyond the scope of this study to determine the cause of the observed results.

Third, until recently in Quebec, many forms of CAM have been difficult to obtain. At the request of the Quebec physicians' association, the provincial government has discouraged the practice of many forms of unconventional medicine during most of the years covered by this study, 1981-1994. The highly publicized trial of Dr. Gaston Naessens is an example of this policy.<sup>55</sup> However, chiropractic care was legalized by the government in



1973 and acupuncture in 1986. CAM has grown rapidly in recent years in the large cities. However, Quebec still lags behind other Canadian provinces and the United States in CAM utilization. In the US, Eisenberg et al. estimated that almost half the population uses some form of CAM.<sup>50</sup> In contrast, in Quebec only 14% of the people use CAM, but in the Canadian Prairie and British Columbian regions usage rates are from 19% - 21%.<sup>48</sup>

Fourth, if the TM subjects had a higher socioeconomic status (SES) than the comparison subjects, they would have had more money to spend on unconventional medicine. We have data on the occupation of the TM subjects, but RAMQ did not provide that data for the NonTM group. Thus, no comparison could be made on socioeconomic status. However, the TM subjects' professions were distributed evenly among numerous occupations with most falling into the middle-class, or medium SES, as found in numerous American national surveys. Eisenberg et al. explained that "the use of alternative therapies is distributed widely across all sociodemographic groups."<sup>50</sup> Even if the TM subjects had more out-of-pocket money to spend on unconventional medical care, it is unlikely that socioeconomic status alone could account for the results of this study, because in Canada CAM usage is a very complex, multidimensional phenomena that involves personal beliefs or worldview, health status, education, age, gender, disenchantment with allopathic medicine, and other variables in addition to socioeconomic level.<sup>32,48,54</sup> An important finding is that randomized studies of subjects have shown the TM technique produced health improvements in all socioeconomic levels.<sup>15-17,20,23</sup> Randomized studies have shown that even TM subjects from low socioeconomic strata exhibited numerous statistically significant results on health and lifestyle outcomes.<sup>15-17,20,23</sup> Thus, for the above reasons the substitution of conventional medical care with unconventional care appears to be an unlikely explanation for the results in this study.

## Implications

High medical expenditures are perceived by many policy makers to be a major problem in the United States, Canada, and most other nations. In 1999, the US spent approximately \$1.2 trillion on medical services.<sup>56</sup> By 2008, this figure will almost double to \$2.2 trillion.<sup>56</sup> Numerous programs have attempted to contain medical expenditures. Between 1994 and 1998, there was some success in cost containment; during that period the rate of growth in medical expenses slowed considerably. However, these rates appear to have been rising more quickly again in 1999.<sup>57</sup> A 1999 survey of 3,166 US companies found that health insurance premiums rose an average of 7.3%, which is almost three times the rate of inflation.<sup>57</sup>

In Canada and the US, payments to physicians have been approximately 20% of total annual health sector spending.<sup>56</sup> Although the findings in our study can not be extrapolated to make inferences about total medical expenditures, the present results may be important because doctors' decisions determine most other medical expenditures such as medical testing, prescription medication, follow-up doctor's visits, surgery, and hospitalization.<sup>58</sup> In 1999, it has been estimated that the US spent \$241.5 billion on physician services.<sup>56</sup> By 2008, American payments to medical doctors has been projected to climb to \$416 billion.<sup>56</sup> The annual percentage declines in the physicians' component of total medical expenses observed in this study (5% - 13% annually) could represent a savings of billions of dollars in large government or private programs over several years. For instance, a 5% reduction in the 1999 US physician payments of \$241.5 billion would be a \$12 billion savings for one year. A 13% reduction would be a \$31 billion savings in one year. If one considers the health spending outlook for the next decade, <sup>56</sup> it is

encouraging to see that it might be possible to reduce at least one component of national medical expenditures.

## SO WHAT? Implications for Health Promotion Practice or Research

This study seems to indicate the Transcendental Meditation technique may decrease physician expenditures. Combined with 590 previous studies of this procedure, there appears to be at least moderate support for this finding. If this assertion holds true, practitioners have another option they might add to comprehensive programs for improving health and containing medical expenses. Researchers might want to conduct randomized studies to ascertain the causal mechanisms of the observed results.

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## TABLE 1

Estimates of Annual Inflation-Adjusted Change in Payments to Physicians for Treating TM and NonTM Subjects



Estimators (n)	Annual Expense Change (In 1992 Canadian dollars) (95% Confidence Interval)		Annual % Change High Estimates Low Estimates*	
	Pre	Post	Pre	Post
<hr/>				
(1) 1% Trim. Mean				
NonTM	\$2.30	\$6.42	3.77%	10.52%
(n=1,390)	(-0.32, 4.93)	(4.05, 8.79)	2.50%	6.97%
TM	\$4.48	-\$0.96	7.34%	-1.57%
(n=1,390)	(1.93, 7.03)	(-4.08, 2.17)	4.86%	-1.04%
Difference:**	\$2.18	\$7.38	3.57%	12.09%
			2.36%	8.01%
(2) 5% Trim. Mean				
NonTM	\$2.75	\$5.20	4.51%	8.52%
(n=1,276)	(0.54, 4.97)	(3.21, 7.18)	2.98%	5.64%
TM	\$3.70	-\$0.69	6.06%	-1.13%
(n=1,276)	(1.64, 5.76)	(-2.97, 1.59)	4.02%	-0.75%
Difference:**	\$0.95	\$5.89	1.55%	9.65%
			1.03%	6.39%
(3) 10% Trim. Mean				
NonTM	\$2.85	\$4.24	4.67%	6.95%
(n=1,134)	(0.91, 4.79)	(2.54, 5.94)	3.09%	4.60%
TM	\$3.09	-\$0.72	5.06%	-1.18%
(n=1,134)	(1.22, 4.96)	(-2.66, 1.21)	3.35%	-0.78%
Difference:**	\$0.24	\$4.96	0.39%	8.13%
		0.26%	5.38%	

(4) Mean				
NonTM	\$2.30	\$7.16	3.77%	11.73%
(n=1,418)	(-0.72, 5.31)	(4.36, 9.96)	2.50%	7.77%
TM	\$3.95	-\$1.25	6.47%	-2.05%
(n=1,418)	(-0.52, 8.42)	(-5.70, 3.20)	4.29%	-1.36%
Difference:**	\$1.65	\$8.41	2.70%	13.78%
			1.79%	9.13%

\*The first values are estimates of the high rate of annual change while the second values are the estimates of the low rate of yearly change. The high and low estimates of annual rates of change percentages were calculated by dividing the estimated annual change in expenses by the highest annual median (\$92.14) and the lowest annual median (\$61.03) for all subjects from 1981 through 1994, respectively.

\*\*TM group minus NonTM group.

P-VALUES (that indicate the significance of the comparison between the TM and Non TM groups):

(1) Pre: 0.2432; Post: 0.00023

(2) Pre: 0.5391; Post: 0.00013

(3) Pre: 0.8618; Post: 0.00016

(4) Pre: 0.5481; Post: 0.0017

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## APPENDIX H

### **Natural medicine effective in chronic illness**

By Alan Mozes

NEW YORK (Reuters Health)

- An updated version of a 5000-year-old physical, mental, behavioral and environmental health system--rooted in natural medicines and emanating from ancient India--may be effective in helping the nearly 100 million Americans who currently suffer from one of many chronic illness such as Parkinson's, diabetes and high blood pressure, according to researchers.

``Western medicine is good for acute conditions but hasn't been that successful in the treatment or prevention of chronic diseases. Natural medicine is the way nature works in terms of organizing and taking care of the universe. So with the right knowledge, ultimately, natural sources can be found to help manage chronic illness," said Dr. Jeremy Fields, study co-author and research project manager at the Center for Healthy Aging at St. Joseph Hospital in Chicago, Illinois.

Fields and his colleagues conducted a pilot study to evaluate the outcomes for four patients with various chronic conditions, who received care based on an alternative medical system of treatment called Maharishi Vedic Medicine (MVM).

The researchers note that this regimen is recognized by the World Health Organization (news - web sites) as a sophisticated system with both a written and oral procedural history based on natural remedies for the prevention and treatment of acute and chronic disease.

The study results are published in the journal Behavioral Medicine.

The three women and one man who served as the sample patients suffered from Parkinson's, sarcoidosis, renal hypertension and diabetes with anxiety disorder, and ranged in age from 47 to 56. Each received a personally designed MVM treatment program that included dietary instructions, herbal preparations, sound therapy, exercise, meditation and pulse diagnosis. Standard measures typically found in healthcare facilities in the US were used to assess the effectiveness of the treatments--including diagnostic lab work and clinical examinations.

After undergoing 3 weeks of MVM treatment, the patients were monitored long-term for periods ranging from 3 months to 18 months. The investigators found that all four patients experienced a significant improvement in their conditions, with a reduction in symptoms such as fever, fatigue, shortness of breath, depression, anxiety and high blood pressure.

In an interview with Reuters Health, Fields stressed that studies such as this highlight and substantiate something that many patients and doctors have already observed anecdotally--natural medicines work.

``The public is going after this natural medicine, no matter whether it's referred to as natural or by its many other names such as 'unproven medicine'

or 'alternative medicine,'" he said.

Fields emphasized that the success of the treatment provided in this study is rooted in the MVM's broad approach in managing chronic disease with an eye to improving a patient's overall quality of life. ``The Vedic system is focused on a holistic level--treating all the aspects of a patient's life including the biology, the genes, the food and the toxins that come in, the mind, the attitudes and the emotions," he explained.

``They're all important because by using mental techniques, exercise, nutrition, pulse diagnosis and sound therapy, you can access a wide range of care for treatment beyond surgery and drugs," Fields said.

SOURCE: Behavioral Medicine 2000;26:34-46.

## **APPENDIX I**

<http://www.latimes.com/editions/ventura/la-000061260jul27.story>

July 27, 2001

A New Front in War on Silent Killers

Health: Researchers test meditation's effect on high blood pressure among blacks.

By JOCELYN Y. STEWART, LA TIMES STAFF WRITER

The qualifications these researchers bring to a new study at Charles R. Drew University cannot be measured solely by their degrees and awards. Consider too all they have lost.

Each man lost his mother to hypertension.

"I knew she went to the doctor," Dr. Keith Norris said of his mother, who died at 52. "I knew she was on some medicine. I didn't know how severe it was. So when she ended up dying from a stroke, it hit me: Here I am a physician and I don't really have the relationship and understanding of this health issue." Now, Norris is one of three key players in a Drew study examining and comparing the effect of transcendental meditation with that of health education on African Americans suffering from heart disease and diabetes. In short, researchers want to see whether meditation can improve health as well as, or better than, classes on diet and exercise.

As researchers, they are guided by the protocols of science. But their relationship with these ailments is also personal.

African Americans are at greater risk for high blood pressure than any other race or ethnic group in the nation and tend to develop hypertension at an earlier age. The greater severity and early onset lead to an 80% higher stroke mortality rate than among the general U.S. population, a 50% higher heart disease mortality rate and a 320% greater rate of hypertension-related end-stage kidney disease, according to a National Institutes of Health report published in 1997.

Norris and his colleagues believe that such disparities do not have to exist, and a key to improved health may lie in the patients' own hands.

The idea is simple: Stress is believed to be a major culprit in such ailments as hypertension and heart disease. Meditation lessens stress and could allow the body to better heal itself. If the hypothesis is correct, the study could one day have implications for all who suffer from such maladies as heart disease, diabetes and hypertension.

"Being able to deal with stress and also being able to affect one's perspective on society in general should help improve high blood pressure and really all medical conditions," said Norris, the study's co-investigator. "Our body has a very powerful ability to heal itself."

Seeking Better Health for African Americans

Norris and his colleagues--Hector F. Myers and Chinelo Haney--are motivated not only by scientific inquiry, but by the possibility that they can dramatically improve the health of African Americans.

"I come to it from the standpoint of trying to understand what is it as a people we struggle with and as a psychologist how do I help us," said Myers, UCLA professor of psychiatry and director of the Biobehavioral Research Center at Drew, and principal investigator of the study. "How do I contribute to possible interventions to address those needs?"

The factors that contribute to stress among African Americans range from unemployment and poverty to racism. Stress is among several factors that contribute to heart disease and hypertension, along with obesity, lack of exercise and smoking.

For all its danger, hypertension has become known as the silent killer because it often produces no symptoms.

"The African American community in this society has, in general, pressing, acute issues to deal with, and so [dealing with] a disease that's asymptomatic is easy to put off," Norris said.

Although hypertension can be treated, the medication often produces side effects, said Norris, which discourages some patients from taking their prescription drugs.

When he entered Howard University Medical School at the age of 19, Norris was not sure what his specialty would be. He was drawn to the study of kidney disorders.

Then, while he was still in training, his middle-aged parents died a year and a half apart. His mother was a schoolteacher. His father, a veterinarian, died of an aneurysm, probably brought on by hypertension.

Now a kidney specialist, Norris sees patient after patient with hypertension. For many years high blood pressure was the leading cause of kidney failure among African Americans. Although diabetes is now the leading cause, Norris said, the vast majority of people with diabetes also have hypertension.

As he advises patients and their families about the illness, Norris draws upon his personal experience.

Since the 1970s, Myers has been involved in hypertension research aimed at demonstrating the relationship between blood pressure and stress.

"Being upset and being angry and frustrated is hard on the cardiovascular system," Myers said.

This is the kind of work that he has wanted to do since he was a student. Born in Panama, Myers had seen in his family the destructive results of hypertension and heart disease.

"Both my maternal grandmother and my mom died of heart disease," he said.

"My mom died relatively young. She was in her 30s."

#### Lessons From Classroom and Community

Myers came to the United States as a student in the 1960s, during the civil rights movement. He identified with the struggle of African Americans and said he was struck by the huge inequities between their health and that of the general population.

Early in his career he decided to merge his medical education with a concern for social justice. So he chose to undergo his training at the Central City Community Mental Health Center, at 42nd Street and Avalon Boulevard, in an African American neighborhood.

Myers said the lessons he learned on the front line of medicine in the community were as important to his education as his formal UCLA experience.

Like Norris and Haney, Myers possesses a "loaded pedigree," a greater likelihood of developing hypertension and other ailments because someone in his family has had it. That personal history has been an added impetus to his research.

"We can't change our genetic inheritance, but we can exercise control over lifestyle and other contributing factors," Myers said. "Stress becomes a target of attention."

Norris, Haney and Myers all have personal experience with meditation.

Although Myers does not meditate regularly, in the 1970s he learned transcendental meditation, also known as TM.

"It's only recently that after many years of doing research on stress and talking about different approaches to stress reduction that I began to think professionally about TM," he said.

More than 18 years ago, Haney--whose background is in health-care administration--began meditating, following a vegetarian diet and trying to convince some in his family to see the benefits. More often he was teased about it. Haney's mother and aunt eventually died three months apart, each from a stroke and an aneurysm.

In his work as project director at Drew, Haney now shares the kind of information he believes could have saved his relatives.

"If they hear one thing that they might not have heard any place else, it might be the one thing that causes them to search or that makes them more disciplined," said Haney, the study's project director. "That one thing can literally make a huge difference in their lives."

Studies examining the effect of transcendental meditation date back to the early 1970s. Maharishi University of Management, founded by practitioners of TM in Fairfield, Iowa, has played a major role in the studies and in the promotion of TM. For the current Drew study, researchers are recruiting about 180 patients, ages 18 and over, with a history of heart disease or diabetes.

The participants will be randomly placed for a year in one of two settings: a meditation group or a health education class.

Those practicing TM are encouraged to meditate 20 minutes twice a day and are taught a mantra.

"Anyone who can think a thought can do this," Haney said. "It's really that simple."

Outside of the meetings, participants are asked to maintain a program of meditation or to incorporate dietary changes and exercise into their lifestyles. Participants will also undergo before and after ultrasound tests to measure the amount of plaque in the carotid artery. The buildup of plaque is often a prelude to a stroke or heart attack. The results of the two groups will then be compared.



A similar Drew study focused on people with hypertension and showed that participants who studied TM experienced a decrease in blood pressure similar to that brought about by certain medications and lifestyle changes. The current study brings together a list of experts in numerous fields, Myers said, including a cardiologist from Cedars-Sinai. The benefits of the study may extend beyond the participants, researchers said. Stress reduction in one person can affect an entire family. Those interested in the study may call (323) 563-4999.

## **APPENDIX J**

**Refer [www.tmpprogram.com.au](http://www.tmpprogram.com.au)**

**Refer VOLUMES 1-5 AND RECENT RESEARCH...actual studies available upon request from the Perth TM™ Centre;contact Perth 9387.1007**

### **SCIENTIFIC RESEARCH ON THE MAHARISHI TRANSCENDENTAL MEDITATION® AND TM-SIDHI® Program** **VOLUMES 1-5 AND RECENT RESEARCH**

There are 508 studies collected in volumes 1 through 5 of Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected Papers, and in the recent research section that follows volumes

1 through 5. These studies are listed below by volume with annotations that summarize their findings. Each reference also includes previous publication information and/or details of the institutes or universities at which the research was conducted as well as conferences at which the research results were presented. The 508 papers are organized chronologically, and by sections, beginning with paper number 1 on the physiological effects of the Transcendental Meditation technique, published in Science in 1970 by Dr. Keith Wallace, and ending with paper 508 on world peace by Dr. Bevan Morris, recently published in Modern Science and Vedic

Science. With some minor variation, each volume is divided into four parts: physiological studies, psychological studies, sociological studies, and theoretical and review papers. Of special interest are the 40 studies on the Maharishi Effect--the growth of coherence in the collective consciousness of states, nations, and the world, which can be found in the final section of Part III: Sociology, B: Productivity and Quality of Life, principally in Vols.

4-5 and in the recent research section. Reprints of individual papers may be ordered through the Institute for Scientific Research, Maharishi University of Management, Fairfield, IA 52557.

SCIENTIFIC RESEARCH ON MAHARISHI'S TRANSCENDENTAL MEDITATION AND TM-SIDHI PROGRAM VOLUME 1 ORME-JOHNSON, D. W., and FARROW, J. T., eds.

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1974. Livingston Manor, New York: MIU Press, 1974. This contribution outlines the broad historical implications of scientific research on the Transcendental Meditation program for developing enlightened individuals, an enlightened society, cultural integrity, and world peace. PART V: THE TM-SIDHI PROGRAM<sup>2102</sup>. ORME-JOHNSON, D. W.; CLEMENTS, G.; HAYNES, C. T.; and BADAWI, K. Higher states of consciousness: EEG coherence, creativity, and experiences of the sidhis. Centre for the Study of Higher States of Consciousness, Maharishi European Research University, Switzerland, 1977. Global EEG Coherence during Experience of the TM-Sidhis; Correlations between High EEG Coherence, Higher States of Consciousness, Experience of the TM-Sidhis, and Creativity.<sup>103</sup> ORME-JOHNSON, D. W., and GRANIERI, B. The effects of the Age of Enlightenment Governor Training Courses on field independence, creativity, intelligence, and behavioral flexibility. Centre for the Study of Higher States of Consciousness, Maharishi European Research University, Switzerland, 1977. Increased Field Independence (Growth of a More Stable Internal Frame of Reference, Increased Perceptual Acuity); Increased Creativity—Increased Figural Fluency and Originality; Increased Intelligence; Increased Behavioral Flexibility Increased Psychomotor Speed and Motor-Cognitive Flexibility (Findings Indicate a Reversal of the Aging Process).<sup>104</sup> CLEMENTS, G., and MILSTEIN, S. L. Auditory thresholds in advanced participants in the Transcendental Meditation program. Department of Experimental Psychology, Maharishi European Research University, Switzerland, and Institut National de la Recherche Scientifique, Centre de Recherche en Sciences de la Santé, Université du Québec, Montreal-Gamelin, Québec, Canada, 1977. Greatly Improved Auditory Thresholds.



## **APPENDIX K**

### **Refer**

1. [www.enlightenedsentencing.org/](http://www.enlightenedsentencing.org/)
2. MJKing, Alternative Law Journal, VOL.25, No.3, June 2000, pp112-116
3. MJKing, Criminal Law Journal, VOL.24, No.6, December 2000, pp335-345

**...actual studies available upon request from the Perth TM <sup>TM</sup>  
Centre;contact Perth 9387.1007**

## **GERALDTON ALTERNATIVE SENTENCING REGIME (GASR)**

### **BULLETIN - FEBRUARY 2002**

#### **1. First Graduate of the Court Supervision Regime (CSR)**

On 21 January 2002 the first person to complete the Court Supervision Regime was sentenced by the Magistrate. In sentencing, the Magistrate made allowance for the significant progress the participant had made on the program.

Prior to admission to the program, the participant had a significant problem with alcohol, having appeared twice before the court within 6 months on driving under the influence charges involving very high blood alcohol readings. On completion of the program the participant reported his anxiety levels - that had caused him to drink - were now under control through his practice of Transcendental Meditation and that he no longer had a problem with alcohol. At the other end of the scale, there has been one defaulter in the CSR - at the time of writing a bench warrant is outstanding. 6 others are at various stages in the CSR.

#### **2. Promising Results from Transcendental Meditation (TM) Program**

Two groups of 7 each have been instructed in the TM program. Eight were referred as part of the first group and 7 attended and were instructed. All 7 referred as part of the second group attended. This represents a remarkably high attendance rate compared to the norm in relation to offender rehabilitation programs generally.

Attendance at follow up sessions has also been generally high - with some failing to attend some sessions.

The second group, who were instructed recently, includes 5 aboriginal people. One of the latter has a solvent abuse problem.

The response from the participants has been entirely positive. They report finding it easy and enjoyable to practice. Several have reported to a psychologist assisting GASR participants that it is the best coping strategy that they have learnt.

Here are some experiences from GASR TM participants.

"I find that when I meditate all my stress and problems from the past are slowly releasing.... I am focussing more positively and can sort out or solve daily problems or issues more calmly."

"I am more alert and have a constant feeling of wellbeing.... I am also more creative.... I am a lot more talkative and feel on an equal level with people instead of inadequate."

"I feel more life."

"I don't harbour feelings of anger or worry inside me like I used to."

"Personally, I feel if I was taught meditation before experimenting with drugs I feel I would have gone a totally different way and I am finding more in meditation than I ever found in using drugs."

One participant said that he had learnt meditation in and out of institutions but this was the first technique that actually worked. Such a comment highlights the need for the use of specific meditation

techniques in offender rehabilitation to be soundly based on research as to their efficiency.

Other benefits reported by participants include decreased anxiety, lower stress levels, improved relations with others, improved sleep and improved wellbeing.

Once participant wrote a letter thanking the Magistrate for placing him in the TM program.

The teaching of TM to offenders has been funded by private donations through The Rehabilitation Foundation. However that source is limited. There is a critical need for funding to ensure the ongoing use of TM and its evaluation in GASR. Given the promising results thus far, further courses are planned, subject to funding.

### **3. Therapeutic Jurisprudence and Criminal Justice**

GASR is an example of the application of therapeutic jurisprudence. Therapeutic jurisprudence suggests that the law can positively or negatively affect psychological well being; GASR endeavours to use court process - including court based management of offenders - to promote the psychological well being of those appearing before it.

The magistrate is to be a commentator at a session entitled "Therapeutic Jurisprudence and Criminal Justice" at the annual conference of the Western Society of Criminology in San Diego in late February. Among other things, he will be discussing the work and approach of the Geraldton Alternative Sentencing Regime.

### **4. Brief Article on the Geraldton Alternative Sentencing Regime**

Brief, published by the Law Society of Western Australia, is to publish an article on the Geraldton Alternative Sentencing Regime in a forthcoming issue. Due to print deadlines, some of the recent

developments covered in this Bulletin could not be included in the article.

#### **5. Court Management Team and Service Providers**

GASR is very much a team oriented project. The court is grateful for the dedicated work of the members of the Court Management Team and the community corrections officers who supervise participants in the Court Supervision Regime and assist those participating in a Brief Intervention.

The court also appreciates the work of the service providers who provide the individual components of the Court Supervision Regime and Brief Intervention Regime including substance abuse counselling, psychological counselling, financial planning, vocational guidance, medical treatment and Transcendental Meditation.

#### **6. Next GASR Steering Committee Meeting**

The next GASR steering committee meeting will be on Thursday 14 February 2002 at 3.30pm in the Jury Assembly Room at the courthouse. If steering committee members have any items for the agenda, please advise the court as soon as possible.

## APPENDIX L

### REPORT#1

ABC TV “LANDLINE” Report by Ian Henschke on 4 June 2000, describes the Organic & Non-gmo opportunity succinctly.  
“Health concern drives organic farming boom”

### REPORT#2

NEW SCIENTIST, February 3, 2001,  
THE GREENER REVOLUTION - SUSTAINABLE AGRICULTURE STUDY

### REPORT#3

Newsweek, March 15, 2000  
Research at The Rodale Institute Challenges Toughest Critics of Organic

### REPORT#4

The Economist, 18 November, 2000, ... The latest trend in genetic engineering

### REPORT#5

University of Copenhagen...  
New Study Finds Organic Is Healthier

### REPORT#6

<http://www.newscientist.com/news/news.jsp?id=ns99992033>  
New Scientist 14.3.02  
Organic food might reduce heart attacks

### REPORT#1

ABC TV “LANDLINE” Report by Ian Henschke on 4 June 2000, describes the Organic & Non-gmo opportunity succinctly.

The report was titled:

**“Health concern drives organic farming boom”**

The genetically modified food debate has seen a surge in sales of organic food and like so many other issues; the marketing not the science may ultimately decide the outcome.

Organic farming is now the fastest growing agricultural sector in Australia.

Once the province of a few hippies on hobby farms, it has become a multi-million dollar business.

Major supermarket chains are now offering organic produce to the public and there are the big export markets opening up in Europe, America and Japan.

The Japanese alone last year spent close to \$2 billion on organic products.

Behind the growth is a growing consumer demand for organic produce in the face of food scares and negative relation to genetically modified foods.

While Australia missed out on mad cow disease, it had problems with contaminated beef and salamis so riddled with killer ecoli the manufacturers were charged with manslaughter.

Claims of chemical contamination also recently rocked the wine industry.

On top of that, we are now being told that many of the foods we eat are already or are about to be genetically modified.

All this has helped lift the profile of the organic food industry.

### **Growth industry**

By definition, organic foods are grown without artificial fertilisers, herbicides or pesticides. Organic farming places emphasis on soil vitality and long-term sustainability. Organic farmers have their own certification systems for domestic production and export.

Although it only accounts for less than two per cent of Australia's total agricultural output, the organic food market world wide is worth somewhere between \$10-\$15 billion a year - and the market is growing.

John Brumby, the new Minister for State and Regional Development in Victoria, told the first national organic food conference in Melbourne last month..."It is estimated that organic food in Australia is a \$200 million niche market growing upwards of 30 per cent per annum...I think it is the closest industry...to the internet in terms of...growth rates,"  
Today, Australia now has the largest area of farmland certified organic in the world - increasing from 372,000 hectares in 1990 to more than 7 million hectares.

### **Increased demand**

This massive increase in production at all levels has seen organic food move from being a fringe product to part of mainstream retailing.

The big supermarket chains are now responding to customer demand.

Linda Heron of Coles Supermarkets said customers were drawn to organic food because they wanted a healthier lifestyle.

"I think it's a trend, not a fad and it will just slowly continue to grow," she said.

Ms Heron is the manager responsible for all Coles supermarkets in South Australia, Tasmania, The Northern Territory and the top end of Western Australia and she has seen the demand for organic food outstrip supply over the past two years.

Coles - like other big food retailers - has not pushing the organic barrow but rather reacting to the demand in the market place.

"At the moment there is more demand than supply," Ms Heron said.

**"It is getting that supply and a wider range, nationally and consistently, is what customers are looking for."**

Demand has grown even though organic food generally costs more, with some items up to double the price.

Although organic foods are being touted as better for human health in the long term, it may be the fact that organic production is kinder to the environment that is the real selling point.

Australia's organic growers are sending shipments to Europe but perhaps the biggest opportunity for farmers is to supply organic and GM-free produce to the growing market in Asia.

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## REPORT#2

### **NEW SCIENTIST**, February 3, 2001, this article **THE GREENER REVOLUTION - SUSTAINABLE AGRICULTURE STUDY**

Low-tech "sustainable agriculture," shunning chemicals in favour of natural pest control and fertiliser, is pushing up crop yields on poor farms across the world, often by 70 per cent or more. The claim being made in the biggest ever survey of green-minded farming.

The findings will make sobering reading for people convinced that only

genetically modified crops can feed the planet's hungry in the 21st century.

A new science-based revolution is gaining strength built on real research into what works best on the small farms where a billion or more of the world's hungry live and work..."sustainable agriculture" sounds like a luxury the poor can ill afford,...but in truth it is good science, addressing real needs and delivering real results. For too long it has been the preserve of environmentalists and a few aid charities. It is time for the major agricultural research centres and their funding agencies to join the revolution.

#### REPORT#3

#### **Newsweek, March 15, 2000 QUOTES:**

#### **Research at The Rodale Institute Challenges Toughest Critics of Organic**

Implementation of the first national standards for organic food isn't the only reason why consumers and growers should feel confident about the future of the \$6 billion organic industry. A report by The Rodale Institute that documents findings from its 19- year-old Farming Systems Trial (FST) will go a long way toward silencing the most outspoken critics of organic agriculture.\*

Funded by The Rodale Institute, a nonprofit organization, and in cooperation with the U.S. Department of Agriculture-Agricultural Research Service (USDA-**ARS!!!!!!**), the FST experiment covers 12 acres and compares highly productive, intensive corn/soybean systems under conventional and organic management. Although still in progress, the FST is the first experiment of its kind to prove that organic methods are as efficient, economical and financially competitive as conventional methods, as well as better for the soil and the environment.

Without scientific proof to counter their arguments, advocates and critics of organic methods have clashed regularly over three main issues: **yields, environmental benefits and economics**. The Rodale Institute's FST findings prove conclusively that not only is organic agriculture a profitable alternative to conventional agriculture, it provides a significant solution for an array of worldwide concerns such as soil quality, global warming, groundwater pollution, poverty alleviation and the preservation of human health.

Critics of organic agriculture have long suggested that pesticides, fertilizers and biotechnology are necessary to produce yields sufficient to meet the world's



demand for food on today's available farmland. They contend that it would be necessary to plough under thousands of additional acres of wild land to produce sufficient yields using organic methods. However, assessing plots of equal size, The Rodale Institute's trials reveal that after a transitional period of about four years, crops grown under organic systems yield as well as, and sometimes better than, those grown conventionally. In fact, in years of less-than-optimal growing conditions such as drought, organic systems can actually out-produce conventional systems.

The FST compares three distinct methods of producing crops: **conventionally with standard fertilizers and chemicals**, **organically with animal manures as a primary nitrogen source**, and **organically with legume crops (or green manure) as a primary nitrogen source**. The findings show that the organic practices improve soil quality significantly, increasing the retention of moisture, carbon and nitrogen, and suggesting a role for organic agriculture in the reduction of negative environmental impacts such as erosion, drought, greenhouse gases and groundwater pollution. The organically managed soil also showed a higher level of microbial activity and a greater diversity of microorganisms. These long-term changes in the character of the soil promote plant health and may positively affect the way in which elements such as carbon and nitrogen are cycled in the soil.

Most significantly, the yield results from the FST undermine the argument of critics that organic agriculture cannot compete economically. Analysis of data produced by the trials indicates that organic systems can compete with conventional systems after a **transition period**. Projected profits ranged from **slightly below** to **substantially above** those in the conventional system, **even though economic analyses did not assume any price premium for organically grown crops**.

"The FST is a global agriculture research and educational treasure," says John Haberer, The Rodale Institute's president. He adds, "With this unique living laboratory, we have proved scientifically that organic agriculture works. It is a viable alternative to conventional farming because it's an economical resource that can empower people to build healthy soil, produce healthy food and sustain human and environmental health."

#### REPORT#4

**The Economist**, 18 November, 2000, quotes:

**The latest trend in genetic engineering** is to 'abandon ship', so to speak. Aventis, a Franco-German drug company responsible for the Starlink debacle and extensive mismanaged canola releases in Australia, announced it will sell its agricultural business by the end of next year. Other nervous companies

include AstraZeneca and Novartis, which agreed to merge their agribusiness last year. Their bio-tech baby Syngenta was a stockmarket flop, capitalising at just over half of the expected \$10 billion when it was floated on November 13.

GE drug company Pharmacia bought the infamous bio-tech food group Monsanto, and is now expected to sell it within two years. Smaller company DuPont is also expected to sell its GE drug-making business, as is German company BASF who's drug division is small and unsuccessful.

#### REPORT#5

University of Copenhagen...

#### **New Study Finds Organic Is Healthier**

We've all suspected it. Now, a growing body of scientific evidence is indicating that organic food is healthier than conventional produce. Researchers from the University of Copenhagen recently reported that organically grown produce has higher levels of nutrients when compared with conventional produce. Specifically, the organic crops had a higher concentration of vitamins and far more secondary metabolites, which are naturally occurring compounds that help immunize plants from external attack. Some of these metabolites are thought to lower the risk of cancer and heart disease in humans.

The research was funded by the United Kingdom's Soil Association (the largest organic farmer organization in the UK) and reported at the Association's January 8 conference.

## **REPORT#6**

<http://www.newscientist.com/news/news.jsp?id=ns99992033>

New Scientist 14.3.02

### **Organic food might reduce heart attacks**

09:40 14 March 02

Exclusive from New Scientist Print Edition

Eating organic food may help reduce your risk of heart attacks, strokes and cancer. The finding will reignite the debate over its health benefits and may force regulatory agencies to reconsider their position.

Until now there has been little scientific evidence to suggest that organic food is any healthier than conventional produce. The head of the British Food Standards Agency, John Krebs, has gone so far as to say it is no better. But John Paterson, a biochemist at Dumfries and Galloway Royal Infirmary, criticises Krebs for making such statements "on the basis of very little information".

Now Paterson and a team from the infirmary and the University of Strathclyde have found that organic vegetable soups contain almost six times as much salicylic acid as non-organic vegetable soups. The acid is responsible for the anti-inflammatory action of aspirin, and helps combat hardening of the arteries and bowel cancer.

"Eating organic may be good for you," says Paterson. "I'm not an evangelist for the organic food movement, but there was a fairly substantial difference."

### **Carrot and coriander**

The average level of salicylic acid in 11 brands of organic vegetable soup on sale in Britain was 117 nanograms per gram, compared with 20 ng/g in 24 types of non-organic soup. The highest concentration of the acid, 1040 ng/g, was found in carrot and coriander soup made by Simply Organic based in Bilston Glen, Scotland, while it was not detectable in four traditional soups made by Scottish company Baxters.

Salicylic acid is produced naturally in plants as a defence against stress and disease. This could explain why levels are higher in organic vegetables, which are generally grown without protection from pesticides.

Earlier research by Paterson's team discovered significantly higher concentrations of the acid in the blood of vegetarian Buddhist monks compared with that of meat-eaters.

The Food Standards Agency now promises to study the new evidence. "We are aware of the suggested benefits of high levels of salicylic acid and will look at what the report has to say," says a spokeswoman.

Journal reference: *European Journal of Nutrition* (vol 40, p 289)