A new clinically-proven technique
to reduce cardiovascular disease
and its risk factors

Scientific evidence of the clinical efficacy
and cost effectiveness of the
Transcendental Meditation® Program

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**EXECUTIVE SUMMARY**

Recent clinical trials, other controlled studies, and meta-analyses (of all relevant studies) have identified a new non-drug treatment that leads to improved medical outcomes for patients with cardiovascular disease including hypertension and coronary heart disease.

This treatment, the Transcendental Meditation program, is widely acceptable, cost effective, and free of harmful side effects. We propose that the Transcendental Meditation program be actively utilized (1) as a first-line or adjunctive non-drug therapy in high blood pressure—hypertension (HTN) and (2) in the adjunctive treatment of coronary heart disease (CHD).

We recommend that insurance companies and other third-party payers provide reimbursement for Transcendental Meditation instruction for:

1. treatment of hypertension—either as sole therapy or adjunctive to other conventional therapies
2. treatment of coronary heart disease—as part of a multifaceted program including other forms of lifestyle modification and drug therapy as indicated

The scientific rationale for the effectiveness of the Transcendental Meditation program for these conditions is based on two premises: (i) the well-established principle that stress causes, contributes to and/or exacerbates cardiovascular diseases such as hypertension and coronary heart disease, and (ii) a large body of evidence showing that the Transcendental Meditation technique is the most effective stress-reduction technique available for cardiovascular disease patients. Extensive scientific research has shown reductions in high blood pressure, hardening of the arteries, enlarged heart size, insulin resistance, anxiety, smoking, alcohol use and mortality.

Reducing stress, which means reducing abnormalities in the body that are the result of overload, naturally reduces the physiological and pathological consequences of chronic stress.

There are yet other reasons for insurance companies to cover this intervention. Several cost-benefit analyses indicate lower hospitalization rates, lower outpatient utilization rates and longitudinal reductions in health care costs for those who regularly practice this particular meditation technique.

Further, there are simultaneous improvements in health and quality of life in patients across a wide range of stress-related disorders.

**BACKGROUND**

**Inadequacies of conventional therapy**

Conventional drug therapies do not address the causes of cardiovascular disease, which are often rooted in unhealthy lifestyle behaviors. Furthermore, conventional pharmacological and surgical therapies for cardiovascular disease often lead to serious adverse effects, including adverse drug effects, impairments in quality of life, and increased mortality.

For these reasons, national practice guidelines of the American Heart Association, the American College of Cardiology, the National Institutes of Health (NIH) and other professional associations recommend non-drug lifestyle modifications (i) as the first line of therapy for individuals with hypertension and (ii) as part of a comprehensive package of lifestyle modifications and drug therapy for individuals with diagnoses of CHD.

This latter group includes patients patients who have had a myocardial infarction, coronary artery procedures to open clogged arteries (revascularization), chronic angina or stroke.

In contrast, the Transcendental Meditation program,

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**FIGURE 1: DECREASED BLOOD PRESSURE**

This study was a meta-analysis examining the effect of all published randomized, controlled clinical trials on the effects of the Transcendental Meditation program on blood pressure, comprising nine studies with 711 subjects. The Transcendental Meditation program was found to have a statistically significant impact of reducing both systolic and diastolic blood pressure. Reference: *American Journal of Hypertension* 21: 310–316, 2008.

**FIGURE 2: DECREASED BLOOD PRESSURE COMPARED TO OTHER TECHNIQUES**

This meta-analysis of 107 published studies on stress reduction and blood pressure found that only the Transcendental Meditation program had a statistically significant impact of reducing high blood pressure among hypertensive subjects. Reference: *Current Hypertension Reports* 9: 520–528, 2007.
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introduced to the world 50 years ago by Maharishi Mahesh Yogi, targets a basic, contributing cause of cardiovascular disease, the lifestyle factor we call stress. Many research studies document the stress-reducing and health-promoting effects of the Transcendental Meditation program, and there have been no documented adverse effects associated with the use of the program to reduce stress, treat cardiovascular disease, or with its use by the general population for disease prevention and health promotion.

Data supporting the effectiveness of the Transcendental Meditation program in treating cardiovascular disease

a. Hypertension: Randomized clinical trials and other controlled studies show that the Transcendental Meditation program reduces blood pressure in persons with hypertension [1-4]. End organ damage associated with hypertensive heart disease is also reduced.

Patients with high blood pressure who learned the Transcendental Meditation program did not show significant elevations in left ventricular mass when compared to health education controls who learned to reduce their risk of heart disease through proper diet and exercise. Reference: Stroke, 2000 Mar., 31(3):568-73.

Patients with coronary artery disease who learned the Transcendental Meditation program showed significantly reduced carotid artery wall thickness after 9 months, a surrogate measure of reduced atherosclerotic plaque, compared to health education controls who learned how to reduce their risk of heart disease through proper diet and exercise. Reference: Stroke, 2000 Mar., 31(3):568-73.

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risk for serious cardiovascular disease, that is heart attacks and strokes

Nearly simultaneously, a systematic review and meta-analysis of all the published literature on stress reduction and relaxation methods for high blood pressure was conducted by Rainforth et al. [6] (FIGURE 2). These authors critiqued previous meta-analyses of stress reduction, other relaxation methods and high blood pressure and concluded that most were outdated or methodologically limited.

They, therefore, conducted an updated systematic review of the published literature and identified 107 studies on stress reduction and BP. Seventeen trials (with 23 treatment comparisons and 960 participants with elevated BP) met criteria for a well-designed, randomized controlled trial.

Meta-analysis was used to calculate BP changes (SBP/DBP) for biofeedback, -0.8/-2.0 mm Hg (P = not significant [NS]); relaxation-assisted biofeedback, +4.3/+2.4 mm Hg (P = NS); progressive muscle relaxation, -1.9/-1.4 mm Hg (P = NS); stress management training, -2.3/-1.3 mm Hg (P = NS); and the Transcendental Meditation program, -5.0/-2.8 mm Hg (P = 0.002/0.02).

They concluded that simple biofeedback, relaxation-assisted biofeedback, progressive muscle relaxation and stress management training did not elicit statistically significant reductions in elevated BP while Transcendental Meditation did.

They also concluded that the Transcendental Meditation program should be recommended to patients with elevated BP for preventing or treating hypertension and other forms of cardiovascular disease.

Available evidence thus indicates that: (i) among stress reduction approaches, only the Transcendental Meditation program is associated with statistically significant reductions in BP and (ii) Transcendental Meditation causes reductions in other risk factors for cardiovascular disease and improvements in clinical cardiovascular disease-related outcomes.

b. Coronary Heart Disease: A series of NIH-sponsored clinical trials found that high-risk patients who were randomly assigned to the Transcendental Meditation program showed reductions in...

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Figure 7: Long-Term Effects of Transcendental Meditation on All-Cause Mortality

Elderly patients (average age 72 years) with high blood pressure who learned the Transcendental Meditation Program showed significantly lower all-cause mortality rates including cardiovascular over a 10 year period compared to combined controls (health education, mindfulness, generic relaxation and usual care). Reference: American Journal of Cardiology, 2005. 95(9): 1060-1064.

Figure 8: Reduction of Cardiovascular Mortality

This study followed the mortality pattern an average of 8 years after elderly individuals with high blood pressure learned the Transcendental Meditation technique or participated in control interventions. The results showed a 30% decrease in the rate of cardiovascular mortality among those who learned the Transcendental Meditation technique. Reference: American Journal of Cardiology 95:1060–1064, 2005

Figure 9: Effectiveness in Reducing Trait Anxiety

A meta-analysis of 146 studies comparing the effectiveness of different mental and physical relaxation techniques including biofeedback on reducing trait anxiety showed that the Transcendental Meditation technique was most effective by a statistically significant margin. Reference: Journal of Clinical Psychology, 1989. 45(6): 957–974.

Figure 10: Decreased Cigarette Smoking

A meta-analysis of all research studies on the Transcendental Meditation Programme related to cigarette smoking, in comparison to meta-analyses of standard treatment and prevention programmes for smoking, found a significantly greater reduction of cigarette use among those who learn the Transcendental Meditation Programme, even though this programme does not involve any guidance about change in lifestyle or habits. Reference: Alcoholism Treatment Quarterly 11: 13–87, 1994.

Figure 11: Decreased Alcohol Use

A meta-analysis of all research studies on the Transcendental Meditation Programme related to alcohol use, in comparison to meta-analyses of standard alcohol treatment and prevention programmes, found a significantly greater reduction of alcohol use among those who learn the Transcendental Meditation Programme, even though this programme does not involve any guidance about change in lifestyle or habits. Reference: Alcoholism Treatment Quarterly 11: 13–87, 1994.

Figure 12: Decreased Hospitalization

An analysis of five years of medical insurance data found that the significant reduction in hospitalization among participants in the Transcendental Meditation Program, in comparison to other insured persons, was even more dramatic among participants who were older. Reference: Psychosomatic Medicine 49: 493–507, 1987.

Figure 13: Decreased Hospitalization Indicating Healthier Ageing

Risk factors for CHD including hypertension [1,2] (FIGURE 3), clogging of the arteries (atherosclerosis) [7,8] (FIGURE 4), the size of the heart’s left ventricle [9] (FIGURE 5) and resistance to the effects of insulin [10] (FIGURE 6). Another trial showed that Transcendental Meditation increases exercise tolerance in coronary heart disease patients [11].

The long-term effects of the Transcendental Meditation program were also assessed by evaluating its effects on all-cause mortality and cardiovascular mortality (FIGURES 7-8). This analysis was done for older subjects who had high blood pressure and who had participated in randomized controlled trials that included the Transcendental Meditation program and other behavioral interventions [12]. The Transcendental Meditation program increased survival (that is, decreased mortality). A statistical analysis showed 23% reduction in the mortality rate from all causes.

Additional analyses showed that after an average of 7.6 years, there was a 30% decrease, in the rate of cardiovascular disease-related mortality (relative risk = 0.70) in the Transcendental Meditation group (compared to combined controls).

c. Psychosocial Stress: In a meta-analysis of the effects of stress reduction and relaxation techniques on anxiety, the most commonly studied form of psychosocial stress, Dr. K. Eppliey of Stanford University and his colleagues separately estimated and compared the effects of the main classes of mind-body techniques—stress reduction, relaxation, and Transcendental Meditation. (FIGURE 9).

They reported that the Transcendental Meditation technique reduced anxiety to a significantly greater extent than other clinically devised forms of relaxation or stylized rest. These differences were found even after adjustment for experimental design, duration of treatment, expectancy of benefits, and experimenter attitude [14,16].

This meta-analysis has been critically reviewed [17,18]. Other published meta-analyses have reported that the Transcendental Meditation technique reduced other risk factors for CHD, including sympathetic nervous system arousal [13], smoking [16] (FIGURE 10), and alcohol consumption [16] (FIGURE 11).
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WHAT IS THE TRANSCENDENTAL MEDITATION PROGRAM?

The Transcendental Meditation technique is a traditional meditation modality that has its origin in the ancient Vedic tradition [19,20]. Maharishi Mahesh Yogi restored the Vedic knowledge for the full scientific value of its theory and practice [21]. It is not a philosophy or a religion. It is neither a concentration nor a contemplation technique.

It is a simple yet precise mental technique practiced twice daily for 15 or 20 minutes each session while sitting comfortably in a chair with eyes closed. The practitioner experiences a unique state of restful alertness.

The Transcendental Meditation technique has been taught worldwide since 1957. Over the last 50 years, about 2 million people in the US and about 6 million people worldwide have taken the standard Transcendental Meditation course [22]. A significant volume of research demonstrates its benefits.

HOW DOES THE TRANSCENDENTAL MEDITATION TECHNIQUE WORK?

Basic and clinical research indicates that practice of the Transcendental Meditation ameliorates hypertension and cardiovascular disease by reducing stress. This in turn reduces the chronic activation of physiological stress response systems, especially ones that affect the cardiovascular system.

One of these is the sympathetic nervous system (SNS) that causes fight or flight response to the heart and blood vessels. Another is the hypothalamic pituitary-adrenal (HPA) axis [23,24] which allows psychosocial stress to drive up blood levels of stress hormones such as cortisol.

As the chronic effects of stress on mind and body are reduced by regular practice of the Transcendental Meditation program, risk factors for CHD are reduced. As shown above, these include: 1) cardiovascular reactivity [25-27]; 2) anxiety [14]; 3) hypertension [1,2,6,15]; 4) insulin resistance (considered the basis of metabolic syndrome) [10]; 5) smoking [16]; 6) alcohol abuse [16]; and 7) surrogate and intermediate endpoints for CHD such as (a) myocardial ischemia [11], (b) carotid artery wall thickness [7-8], and (c) left ventricular enlargement (hypertrophy) [7,9,11,29].

This integrated series of effects leads to a reduction in clinical CHD-related events including premature mortality [12]. It is suggested that the Transcendental Meditation program reduces cardiovascular disease and its risk factors because it allows the practitioner to achieve a unique state of restful alertness that allows the body’s endogenous homeostatic and self repair mechanisms to become restored and reactivated.

When this happens, blood pressure and other key factors revert back to their original, healthier set points. In other words, the Transcendental Meditation program may be thought of as a technique to enliven the body’s own inner intelligence [19]. These findings are completely in accord with the widely accepted biobehavioral model of cardiovascular disease [23,24].

Figure 13: Decreased Outpatient Visits Indicating Healthier Ageing

Participants in the Transcendental Meditation Program, in contrast to the average of all other insured persons, showed a significant reduction in outpatient doctor visits that was even more pronounced among participants who were older, as indicated by analysis of five years of medical insurance data. Reference: Psychosomatic Medicine 49: 493–507, 1987.

CONCLUSION

A cumulative body of well-designed clinical trials, other clinical studies, and meta-analyses demonstrates that a nonpharmacologic approach—the Transcendental Meditation program—for the treatment of hypertension, coronary heart disease and their risk factors is effective in the sole or adjuvant care of cardiovascular disease. Furthermore, there are no harmful side effects.

Simultaneously, quality of life is improved and other chronic stress-related conditions are reduced or eliminated. These clinical effects are cost-effective. Based on the published biomedical evidence, it is proposed that payment of the cost of Transcendental Meditation instruction by insurance companies and third party payers is justified and timely.

Figure 14: Decreased Medical Expenses

This study measured annual percentage change in government payments for physicians’ services over 14 years among 1,418 people in Quebec, Canada, who learned the Transcendental Meditation program in comparison to randomly-selected controls. After learning the Transcendental Meditation program, individuals showed an average annual decline of 13.8 per cent in payments. Reference: American Journal of Health Promotion 14: 284–291,2000.

COST/BENEFIT CONSIDERATIONS

Using the Transcendental Meditation program is cost-effective. On the cost side, the course fee for enrolling in the three-month Transcendental Meditation course is $2000 for an individual, including a free life time follow-up program.

On the benefit side, studies [30-34] show that regular practice of the Transcendental Meditation Technique lowers health insurance utilization rates with significantly fewer hospital inpatient days and outpatient visits, and fewer inpatient admissions for all major categories of disease (FIGURES 12-14).

Across all disease categories, there was a 56% lower utilization rate. For the two key physiological systems relevant to this proposal, reductions were even greater: 87% reductions for both cardiovascular disease and for diseases of the nervous system. A Canadian study [32-33] showed a longitudinal reduction (a cumulative savings of 13% per year) in government payments to physicians.
Major Cardiovascular Disease Factors Reduced by One Natural and Effective Procedure, Free From Side-Effects

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Published Research on Transcendental Meditation

- Reduced Sympathetic Nervous System Arousal
- Faster Recovery from Stress
- Decreased Medical Expenses
- Decreased Hospitalization
- Decreased Outpatient Visits
- Improvement of Cardiovascular Mortality
- Improved Functional Capacity in Heart Failure
- Regression of Left Ventricular Mass
- Improved Exercise Tolerance in Angina Pectoris
- Decreased Cigarette Smoking
- Reduced Alcohol Use
- Reduction of Atherosclerosis

Improved Clinical Outcome and Reduced Need for Pharmacological and Surgical Treatments

Thousands of physicians worldwide recommend the practice of Transcendental Meditation to their patients

- Decreased Anxiety and Depression
- Decreased Blood Pressure
- Decreased Insulin Resistance
- Reduced Cholesterol
- Reduced Cigarette Smoking
- Decreased Alcohol Use
- Improved Exercise Tolerance in Angina Pectoris
- Improved Function of the Cardiovascular System
- Cardiovascular Mortality Reduced
- Decreased Need for Pharmacological and Surgical Treatments
- Improved Clinical Outcome and Reduced Need for Pharmacological and Surgical Treatments
- Decreased Angina Pectoris
- Improved Exercise Tolerance
- Decreased Hospitalization
- Decreased Outpatient Visits
- Reduction of Cardiovascular Mortality
- Improved Functional Capacity in Heart Failure
- Regression of Left Ventricular Mass
- Improved Exercise Tolerance in Angina Pectoris
- Decreased Cigarette Smoking
- Reduced Alcohol Use
- Reduction of Atherosclerosis

The indicated sequence is a simplified version of complex and parallel physiological interactions.
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Meditation benefits patients with heart disease

Blood pressure, insulin resistance improved, even without weight loss

(June 13, 2006) In a study of adults with coronary heart disease who were stable and were receiving optimal medical care, 16 weeks of transcendental meditation not only led to significant reductions in blood pressure, but also improved heart rate variability and insulin resistance, which is associated with an increase risk of diabetes.

NEWS RELEASE
MARCH 12, 2007
Penn Study Shows Transcendental Meditation Can Help Combat Congestive Heart Failure
Results of NIH-Funded Study Published in the Journal Ethnicity & Disease

Science and Your Health
A guide to some of the newest research and recommendations

Meditation and Medication
Stress-reduction techniques such as meditation may help reduce high blood pressure and the need for treatment, according to a study published in the American Journal of Hypertension last week.
Achieving Better Health and Reducing Healthcare Costs through the Transcendental Meditation Program

For more information refer to:

www.doctorsontm.org
www.mum.edu/inmp

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