

As the premier scholarly publication of the osteopathic medical profession, *JAOA—The Journal of the American Osteopathic Association* encourages osteopathic physicians, faculty members and students at colleges of osteopathic medicine, and others within the healthcare professions to submit comments related to articles published in the *JAOA* and the mission of the osteopathic medical profession. The *JAOA*'s editors are particularly interested in letters that discuss recently published original research.

Letters to the editor are considered for publication in the *JAOA* with the understanding that they have not been published elsewhere and that they are not simultaneously under consideration by any other publication.

All accepted letters to the editor are subject to editing and abridgement. Letter writers may be asked to provide *JAOA* staff with photocopies of referenced material so that the references themselves and statements cited may be verified.

Readers are encouraged to prepare letters electronically in Microsoft Word (.doc) or in plain (.txt) or rich text (.rtf) format. The *JAOA* prefers that readers e-mail letters to jaoa@osteopathic.org. Mailed letters should be addressed to Gilbert E. D'Alonzo, Jr, DO, Editor in Chief, American Osteopathic Association, 142 E Ontario St, Chicago, IL 60611-2864.

Letter writers must include their full professional titles and affiliations, complete preferred mailing address, day and evening telephone numbers, fax numbers, and e-mail address. In addition, writers are responsible for disclosing financial associations and other conflicts of interest.

Although the *JAOA* cannot acknowledge the receipt of letters, a *JAOA* staff member will notify writers whose letters have been accepted for publication. Mailed submissions and supporting materials will not be returned unless letter writers provide self-addressed, stamped envelopes with their submissions.

All osteopathic physicians who have letters published in the *JAOA* receive continuing medical education (CME) credit for their contributions. Writers of original letters receive 5 hours of AOA Category 1-B CME credit. Authors of published articles who respond to letters about their research receive 3 hours of Category 1-B CME credit for their responses.

Although the *JAOA* welcomes letters to the editor, readers should be aware that these contributions have a lower publication priority than other submissions. As a consequence, letters are published only when space allows.

Pandora's Boxes: Questions Unleashed in Airport Scanner Debate

To the Editor:

Like the chaos unleashed by the mythical Pandora's box, the decision of the Transportation Security Administration (TSA) to begin installing advanced imaging technology in airports has led to the public being bombarded by conflicting information about the new "full-body scanners." The two types of scanning technology being implemented are, pri-

marily, "backscatter" models, which use low levels of ionizing radiation, and, less commonly, "millimeter wave" models, which use radio frequencies from 30 GHz to 300 GHz.¹

The ionizing radiation of backscatter models is potentially carcinogenic to human tissues, and radiation doses are cumulative to tissues that are repeatedly exposed. The radio frequencies of millimeter wave models are not currently considered to be inherently carcinogenic. However, there is much more information available about backscatter systems,

which were introduced in 1992, than about the newer millimeter wave systems, which are still not widely used in airports.²

The debate over these scanning technologies in the news media has centered primarily on traveler privacy issues related to the images produced. The debate has focused only secondarily on the safety of the traveling public exposed to such scans and on the effectiveness of these technologies in detection. We believe that issues of traveler privacy and machine effectiveness are best discussed in other venues. In the present letter, we address concerns related to the safety of scanner radiation. Because the Department of Homeland Security views the body scanner issue to be a sensitive matter of national security, we anticipate that there is some information concerning these technologies that is not available to us.

From the available literature that we reviewed, we found that radiation dosing from a single backscatter scan is reported as ranging from 0.005 mrem to 0.009 mrem.^{3,4} By comparison, a passenger on a cross-country flight receives approximately 3 mrem of radiation, and the dose from a single chest radiograph is 10 mrem.³ Backscatter systems have not proven to be harmful, according to several authorities, including the TSA, the US Food and Drug Administration's Center for Devices and Radiological Health, the National Institute of Standards and Technology,⁵ The Johns Hopkins University Applied Physics Laboratory,⁶ the Center for Radiological Research at Columbia University,⁷ the United Kingdom's Health Protection Agency,⁸ and the American College of Radiology.⁹ The American College of Radiology has reported that "a traveler would require more than 1,000 backscatter scans in a year to reach the effective dose equal to one standard chest x-ray."⁹

(continued)

There are 3 backscatter models that are currently manufactured for security screening. American Science and Engineering Inc of Billerica, Massachusetts, produces the SmartCheck¹⁰; Rapiscan Systems of the United Kingdom produces the Secure 1000¹¹; and Tek84 Engineering Group of San Diego, California, produces the Ait84.¹² Of these devices, Rapiscan Systems' Secure 1000 is the most commonly used. In an interview published in the *Los Angeles Times* in November 2010, Peter Kant, Rapiscan Systems' executive vice president of global government affairs, stated that his company produced 211 of the 385 image scanners then in use at the 68 airports in which such machines had been deployed.¹³ (According to the TSA Web site, there were 486 image scanners at 78 airports as of January 2011.¹⁴) Based on the previously cited report by the National Institute of Standards and Technology,⁵ it appears that Rapiscan Systems' Secure 1000 has been designed with appropriate safeguards for widespread deployment.

Despite the published reports that support the safety of backscatter technology,⁵⁻⁹ scientists at the University of California, San Francisco¹⁵ have recently raised questions about how radiation exposures were calculated in the reports—raising doubts about the accuracy of the dose-per-scan data.^{3,4} These scientists have also raised questions regarding whether backscatter scanning would pose an added health risk for individuals who are genetically susceptible to particular cancers.¹⁵ These safety issues certainly require further research. Moreover, we have been unable to find any reports of backscatter technologies being subjected to large-scale clinical outcomes studies or other medical testing with either human or animal subjects.

As we previously noted, questions regarding the effectiveness of scanner technologies are best left to other venues. Nevertheless, all medical decisions involve considerations of risks vs benefits. If a procedure carries a potential risk

(such as radiation exposure) and if the procedure's benefits are in question, such facts would be important to know in making medical decisions, including the decision on whether an individual agrees to be scanned.

In April 2010, *The Vancouver Sun* published a revealing interview with Rafi Sela, former chief security officer at the Israel Airport Authority and a 30-year veteran in airport security and defense technology who helped design security measures at Ben Gurion International Airport in Tel Aviv.¹⁶ Mr Sela was quoted as saying, "I don't know why everybody is running to buy these expensive and useless [full-body scanner] machines. I can overcome the body scanners with enough explosives to bring down a Boeing 747. ... That's why we haven't put them in our airport."¹⁶

In regard to millimeter wave technology, Ben Wallace, a member of the British Parliament who worked on millimeter wave scanners for the defense research organization QinetiQ, was quoted in a January 2010 *Mail Online* article as saying, "The millimeter wave technology is harmless, quick and can be deployed overtly or covertly. But it cannot detect chemicals or light plastics."¹⁷ This limitation could prove to be a serious obstacle in the widespread adoption of millimeter wave technology in airport security.

Of course, the adoption by terrorists of alternative strategies designed to bypass both backscatter and millimeter wave machines—such as body-packing—could render both types of scanners irrelevant. Although concerns about the effectiveness of these devices may one day make the issue of safety mute, such questions persist today.

In summary, it is our sense that—given the current state of scientific knowledge—backscatter radiation scans may be safe, with appropriate built-in safeguards to allow these machines to be deployed for everyday use by appropriately trained personnel. However, large-scale clinical testing of these devices has not yet been performed, and there

are legitimate questions concerning the effectiveness of these machines in accomplishing the task for which they were designed. Therefore, using the logic of the risk-benefit ratio, it might be prudent to obtain more information on clinical exposure and more confirmation of device effectiveness before exposing large segments of the population to these full-body scanners.

Milind R. Limaye, DO, ATP, FE-Turbojet
Emergency Medicine Resident

Harry Severance, MD
Professor of Emergency Medicine
University of Tennessee at Chattanooga

References

1. Ryan KL, D'Andrea JA, Jauchem JR, Mason PA. Radio frequency radiation of millimeter wave length: potential occupational safety issues relating to surface heating. *Health Phys.* 2000;78(2):170-181.
2. Hamilton J. New airport body scans don't detect all weapons. National Public Radio Web site. January 14, 2010. <http://www.npr.org/templates/story/story.php?storyId=122499686>. Accessed January 19, 2011.
3. Layton J. Do "backscatter" X-ray systems pose a risk to frequent fliers? HowStuffWorks Web site. February 27, 2007. <http://science.howstuffworks.com/innovation/backscatter.htm>. Accessed January 19, 2011.
4. Z Backscatter. American Science and Engineering Inc Web site. http://www.as-e.com/products_solutions/z_backscatter.asp. Accessed January 19, 2011.
5. Cerra F. *Assessment of the Rapiscan Secure 1000 Body Scanner for Conformance with Radiological Safety Standards*. Arlington, VA: Transportation Security Administration. July 21, 2006. http://www.tsa.gov/assets/pdf/nist_rapiscan_secure_1000.pdf. Accessed January 19, 2011.
6. The Johns Hopkins University. *Radiation Safety Engineering Assessment Report for the Rapiscan Secure 1000 in Single Pose Configuration*. Version 2.0. Laurel, MD: The Johns Hopkins University Applied Physics Laboratory; August 2010. NSTD-09-1085. http://www.tsa.gov/assets/pdf/jh_apl_v2.pdf. Accessed January 19, 2011.
7. Reinberg S. Airport full body scanners pose no health threat: experts. *Bloomberg Businessweek*. January 8, 2010. <http://www.businessweek.com/lifestyle/content/healthday/634724.html>. Accessed January 19, 2011.
8. Body scanning at airports. UK Health Protection Agency Web site. <http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/UnderstandingRadiationTopics/BodyScanners/>. Accessed January 19, 2011.

(continued on page 119)

(continued from page 88)

9. ACR statement on airport full-body scanners and radiation. American College of Radiology Web site. January 2010. http://www.acr.org/MainMenuCategories/media_room/FeaturedCategories/PressReleases/StatementonAirportFullbodyScanners.aspx. Accessed January 19, 2011.
10. SmartCheck personnel inspection systems. American Science and Engineering Inc Web site. http://www.as-e.com/products_solutions/smart_check.asp. Accessed January 19, 2011.
11. People screening. Rapiscan Systems Web site. <http://www.rapiscansystems.com/peoplescreening.html>. Accessed January 19, 2011.
12. Body scanner. Tek84 Engineering Group Web site. <http://tek84.com/bodyscanner.html>. Accessed January 19, 2011.
13. Martín H. Maker defends airport full-body image scanners. *Los Angeles Times*. November 22, 2010.
14. Advanced imaging technology (AIT). Transportation Security Administration Web site. <http://www.tsa.gov/approach/tech/ait/index.shtm>. Accessed January 19, 2011.
15. Knox R. Scientists question safety of new airport scanners National Public Radio Web site. May 17, 2010. <http://www.npr.org/templates/story/story.php?storyId=126833083>. Accessed January 19, 2011.
16. Schmidt S. Full-body scanners are waste of money, Israeli expert says. *The Vancouver Sun*. April 23, 2010. <http://www.vancouversun.com/travel/Full-body-scanners-waste-money-Israeli-expert-says/2941610/story.html>. Accessed January 19, 2011.
17. Body scanner wouldn't have foiled syringe bomber, says MP who worked on new machines. *Mail Online*. January 3, 2010. <http://www.dailymail.co.uk/news/article-1240193/Body-scanner-wouldnt-foiled-syringe-bomber-says-MP-worked-new-machines.html>. Accessed January 19, 2011.

New COMLEX-USA-to-USMLE Conversion Formula Needed

To the Editor:

I read with interest the letter to the editor by John R. Gimpel, DO, MEd,¹ published in the October 2010 issue of *JAOA—The Journal of the American Osteopathic Association*, regarding the formula proposed by Philip C. Slocum, DO, and Janet S. Louder²⁻⁴ for converting Comprehensive Osteopathic Medical Licensing Examination-USA (COMLEX-USA) scores to United States Medical Licensing Examination (USMLE) scores for use by Accreditation Council for Graduate Medical

Education (ACGME) residency program directors. Dr Gimpel¹ noted that he welcomed suggestions regarding this matter. My suggestion is to allow the USMLE to be used as the competency examination for graduates of colleges of osteopathic medicine (COMs), with an adjunct test required to cover the theory and methods of osteopathic medicine, which are not included in the USMLE. In the interest of full disclosure, I acknowledge that I have not taken either examination yet, as I am currently a second-year osteopathic medical student. However, I do plan on taking the USMLE in addition to the COMLEX-USA.

In the medical education article by Dr Slocum and Ms Louder,² concern was expressed regarding how much of a COM student's score is affected by material unique to the COMLEX-USA, such as questions about osteopathic manipulative treatment (OMT). My suggestion of allowing students' knowledge of science and standard medical practice to be assessed using the USMLE and students' knowledge of OMT to be assessed using an adjunct test would address this concern. Implementing my suggestion would also allow directors of residency programs accredited by the American Osteopathic Association, such as family practice-OMT residencies, to assess student knowledge of osteopathic principles and practice without the possibility of other aspects of the COMLEX-USA outweighing knowledge of that material.

I suspect that Dr Gimpel¹ and the National Board of Osteopathic Medical Examiners may be resistant to this idea. However, my suggestion is more directed toward the American Osteopathic Association and the American Association of Colleges of Osteopathic Medicine, to urge them to consider allowing osteopathic medical students to use the USMLE with an adjunct test to obtain certification and advance through osteopathic medical school.

Jay D. Burmeister, OMS II

Des Moines University—College of Osteopathic Medicine, Iowa

References

1. Gimpel JR. New COMLEX-USA-to-USMLE conversion formula needed [letter]. *J Am Osteopath Assoc*. 2010;110(10):577-578.
2. Slocum PC, Louder JS. How to predict USMLE scores from COMLEX-USA scores: a guide for directors of ACGME-accredited residency programs. *J Am Osteopath Assoc*. 2006;106(9):568-569.
3. Parikh SP, Shiembob CA. New COMLEX-USA-to-USMLE conversion formula needed [letter]. *J Am Osteopath Assoc*. 2010;110(7):400-401.
4. Slocum PC. Response [letter]. *J Am Osteopath Assoc*. 2010;110(7):401.

Response

Student Doctor Burmeister suggests that the American Osteopathic Association (AOA) and the American Association of Colleges of Osteopathic Medicine (AACOM) allow osteopathic medical students to take the United States Medical Licensing Examination (USMLE). In fact, the AOA and AACOM do allow students to take the USMLE; they just do not allow students to substitute the USMLE for the Comprehensive Osteopathic Medical Licensing Examination-USA.

Tangentially, Student Doctor Burmeister struck a chord regarding a basic flaw in osteopathic medical education. We in osteopathic medical education tend to treat osteopathic manipulative medicine (OMM) as an "add on" to the practice of osteopathic medicine. Indeed, many advocates of OMM treat it as a subspecialty, further isolating OMM from mainstream osteopathic medicine. We fail to get the faculty, staff, and students at colleges of osteopathic medicine (COMs) to understand that OMM is more than manipulation and that it should be integrated into every patient interaction.

Few lectures in medicine, surgery, or any other topic at COMs truly integrate osteopathic principles—except to take standard medical principles and stamp the "osteopathic seal of approval" on them. Even when lectures include osteopathic concepts, these concepts are too often introduced for only a few minutes at the end of a standard medical lecture just to tie OMM into the discus-

sion. Until we solve this basic problem to the satisfaction of most members of our profession, we will continue to hear comments similar to those of Student Doctor Burmeister. In fact, those of us who are old enough remember making similar comments ourselves some 40 years ago.

Student Doctor Burmeister should be congratulated and thanked for his willingness to share his views. We should take heed and learn what osteopathic medical students, residents, and young osteopathic physicians—who are our future—want and need in their education and training. All proper tools must be provided to the young members of our profession to allow them to not only have great careers in medicine but, more to the point, to have outstanding careers as leaders in the fastest growing segment of the medical world—osteopathic medicine.

Philip C. Slocum, DO

Professor of Medicine, Dean, Kirksville College of Osteopathic Medicine-A.T. Still University of Health Sciences, Missouri

Response

Thank you for the opportunity to respond to the letter to the editor by Student Doctor Burmeister regarding the Comprehensive Osteopathic Medical Licensing Examination (COMLEX-USA).

As was stated in my original letter (*J Am Osteopath Assoc.* 2010;110[10]:577-578), the National Board of Osteopathic Medical Examiners' COMLEX-USA series assesses the competencies essential for the practice of osteopathic medicine. Osteopathic medical students and residents train for the practice of osteopathic medicine, and the curriculum of every osteopathic medical school and residency program incorporates distinctive osteopathic principles that prepare DOs for this practice. Only the COMLEX-USA series assesses the skills and philosophy unique to the osteopathic medical profession and to the practice of osteopathic medicine. This distinctive examination construct with its integration of osteopathic principles and prac-

tice is *essential*, and this material cannot be covered merely as an *adjunct* to the United States Medical Licensing Examination, as Student Doctor Burmeister suggests.

The osteopathic medical profession honors its contract with the public by ensuring that osteopathic physicians are licensed based on the COMLEX-USA, which is designed specifically for the practice of osteopathic medicine and validated for that distinct purpose.

John R. Gimpel, DO, MEd

President and Chief Executive Officer, National Board of Osteopathic Medical Examiners

How to Avoid a Heart Attack: Putting it all Together

"Poison is in everything, and no thing is without poison.

The dosage makes it either a poison or a remedy."

—Philippus Aureolus Paracelsus

"If you don't read the newspaper, you're uninformed.

If you do read the newspaper, you're misinformed."

—Mark Twain

To the Editor:

We thank Dr Haffey for his response¹ to our critique² of his clinical review article, "How to Avoid a Heart Attack: Putting It All Together," [3] which appeared in the May 2009 supplement to *JAOA—The Journal of the American Osteopathic Association*. Unfortunately, Dr Haffey¹ did not address any of the specific points that we made in our letter.² Dosage, the actual substances used, how far along on the age-related continuum we can expect to see reversibility, and the confluence of multiple nutritional factors—each of which may be necessary but not sufficient alone—are all relevant to cardiovascular outcome studies and the specific points that we raised.

Omega-3 fatty acids in the diet have shown considerable power to favorably

affect vascular and cardiac outcomes in elderly men with or without high risk for cardiovascular disease (CVD).⁴⁻⁶ However, large doses of omega-3 fatty acids for short periods may produce adverse results.⁷ Of course, there is no shortage of studies in which the use of insignificant amounts of omega-3 fatty acids (eg, 200 mg daily of eicosapentaenoic acid, 500 mg daily of docosahexaenoic acid) led to statistically nonsignificant results.⁸ A literature review yielded a study from Japan (where fish intake is much higher than in most other countries) in which further supplementation with 1800 mg daily of eicosapentaenoic acid produced a statistically significant reduction in the number of cardiac events in patients with hypercholesterolemia who were using statins over just a 5-year period.⁹

Vitamin Supplementation

A recent study showed that vitamin D, in large annual doses, produced adverse effects that countered the beneficial effects it produced at lower doses.¹⁰ In another recent study, researchers at Boston University Medical Center completed a randomized, blinded controlled clinical trial of vitamin D₃ supplementation involving 49 normotensive black youth. The investigators found that 2000 IU daily of vitamin D₃ decreased carotid-femoral pulse wave velocity (a measure of arterial stiffness), compared to an increase in carotid-femoral pulse wave velocity in the control group (400 IU daily vitamin D₃).¹¹ Furthermore, evidence from a prospective study of 41,504 individuals indicates that vitamin D deficiency may be associated with prevalent and incident CVD risk factors.¹²

The broad category of CVD has at least 3 age-related common pathways: oxidation, inflammation, and glycation. For the oxidation pathway, the use of antioxidants intuitively makes sense. Although antioxidant supplementation has been shown to reduce oxidative stress and inflammation,¹³ should we really expect antioxidants to reverse cellular DNA damage in patients with coronary artery disease?¹⁴

The Third National Health and Nutrition Examination Survey (NHANES III), covering 1988 to 1994, revealed that 13% of the population in the United States was vitamin C deficient ($<11.4 \mu\text{mol/L}$), and the 2003-2004 NHANES revealed a prevalence of vitamin C deficiency of 7.1%.¹⁵ Low levels of plasma vitamin C have been associated with progression of atherosclerosis, increased risk of acute myocardial infarction in women,¹⁶ higher levels of low-density lipoprotein cholesterol and triglycerides in a meta-analysis of 13 randomized controlled trials,¹⁷ and a higher rate of stroke among middle-aged men with hypertension.¹⁸ It may seem amazing that vitamin C would disassociate the risk of stroke from the precondition of hypertension. Yet, when one reviews the vitamin C-dependant enzymatic reactions involving connective tissue repair—including blood vessels—this disassociation is not surprising at all.¹⁹

For water-soluble vitamin C, addition of 500 mg daily to the dietary intake of middle-aged to elderly Americans is probably not enough to produce statistically significant results. Most studies showing benefits of vitamin C have used at least 700 mg daily.²⁰ However, the bottom of the optimal range may increase with age and may be closer to Linus Pauling's estimate (ie, 2-10 g daily), which was based on the amount of vitamin C necessary to replicate the serum levels of animals that make their own vitamin C. The Linus Pauling Institute recommends vitamin C intake in the range of 200 to 400 mg daily.²¹

Direct arterial infusion of just 1 g of ascorbic acid has been found to improve arterial elasticity immediately in individuals who smoke cigarettes.²² Single nucleotide polymorphisms that code for L-ascorbic acid cotransporter-1 may impair the access and utilization of vitamin C in a minority of patients.²³

Pocobelli et al²⁴ evaluated data from 77,673 men and women, aged 50 to 76 years, who participated in the Vitamins and Lifestyle Study. Questionnaires col-

lected from these participants between 2000 and 2002 provided information on their supplement use over the previous 10 years, and the cohort was followed for 5 years. During the follow-up period, 3577 deaths occurred. Participants whose vitamin C supplementation averaged at least 322 mg daily during the 10-year period had an 11% lower risk of dying during the 5-year follow-up period than did participants who did not use vitamin C. When Pocobelli et al²⁴ examined participant mortality by cause, multivitamin use of 6 to 7 days per week was associated with a 16% lower risk of death from CVD, and vitamin E use of more than 215 mg daily was associated with a 28% lower risk of death from CVD. Although this was "only" an epidemiologic study, the large numbers of participants and the extended length of time allowed small differences to manifest.

As reported in 2010, a prospective population-based study, begun in 1994 in the United Kingdom, evaluated plasma levels and oral intake of vitamin C during a 13-year period in 1054 participants older than 65 years in the British National Diet and Nutrition Survey.²⁵ By September 2008, 74% of the men and 62% of the women had died. The study results showed that increased plasma levels of vitamin C and increased dietary intake of vitamin C were both significantly associated with a reduction in all-cause mortality among participants. The results also revealed that increased dietary intake of vitamins C and E conferred a statistically significant protective effect against cancer.²⁵

Another recent prospective population-based study, conducted at the Karolinska Institute in Sweden, examined multivitamin use in 31,671 women with no histories of CVD and 2262 women with histories of CVD between the ages of 49 and 83 years.²⁶ Use of multivitamins was found to be associated with reduced risk of myocardial infarction—with a multivariable-adjusted hazard ratio of 0.73. In addition, use of multivitamins for at least 5 years was found to be associated with a hazard

ratio of 0.59 among women who were initially free from CVD. The authors concluded, "The use of multivitamins was inversely associated with [myocardial infarction], especially long-term use among women with no CVD."²⁶

For fat-soluble vitamin E, the use of dl α -tocopherol is clearly inferior to the natural mixture of α -tocopherols, γ -tocopherols, and tocotrienols, because dl α -tocopherol competitively inhibits at least the γ -tocopherols.²⁷

The B vitamins may be sufficient to reduce homocysteine levels, but is a homocysteine level of $11 \mu\text{mol/L}$ really low enough to produce a beneficial effect on endothelial inflammation or already-present atherosclerosis?²⁸

As many as 1 in 10 individuals have a defective thermolabile variant of 5,10-methylenetetrahydrofolate reductase that is associated with mild hyperhomocysteinemia, vascular disease, and neural tube birth defects.²⁹ These individuals may require 5-methyltetrahydrofolate (5-10 mg daily) or large doses of trimethylglycine or betaine³⁰ to reduce homocysteine levels to the range of 7 to $8 \mu\text{mol/L}$.³¹ Folic acid used as part of primary prevention has been shown to reduce the risk of stroke in patients.³²

Considering the obesity and diabetes mellitus epidemic of the previous 15 years, a rising incidence of glycation is another probable confounding factor. In the management of prediabetes with metformin, it is probably wise to check patients for vitamin B₁₂ deficiency on a yearly basis.³³

Pharmaceutical Industry Bias

Crucial to the question of what studies we are to accept as valid is the issue of bias, including bias in the context of the US medical system and specialty bias that might contribute to Dr Haffey's¹ certainty that no published evidence exists to support the use of vitamin supplements to improve cardiovascular health. Considering the existence of such bias, are we really being paranoid in picking apart the evidentiary studies discussed by Dr Haffey³ and in finding fre-

quent structural deficiencies in the way these studies applied the scientific method?

In the August 2010 JAOA, Gary P. MacDonald, DO,³⁴ summarized the impact of the recent decision by the US Food and Drug Administration (FDA), based on the JUPITER study,³⁵ to approve use of a particular statin drug for CVD risk reduction in widely expanded populations. Dr MacDonald³⁴ noted the following:

There is no doubt that results of JUPITER are significant—both statistically and clinically. However, the manner in which these results were sold to clinicians, the FDA, and the public were deceptive—damaging the credibility of the FDA and AstraZeneca. ... Considering the misguided logic behind the FDA's decision to expand rosuvastatin's use, the question remains: who are the primary beneficiaries of this decision—patients or the pharmaceutical industry?

The FDA did “step up to the plate” with its independent review of the RECORD trial³⁶ by Marciniak.³⁷ The independent review provided empirical estimates of the potential bias associated with the open-label design of the industry-influenced RECORD trial,³⁶ in which investigators were aware of treatment assignment. Among 549 case-report forms in the RECORD trial,³⁶ the prevalence of such problem cases was higher in the intervention group (16.2%) than in the control group (9.2%).³⁷

A September 2009 *New York Times* article reported on a study in JAMA: *The Journal of the American Medical Association* that revealed that of 630 articles published in major medical journals in 2008, 7.8% had ghostwriters.³⁸ The JAMA authors' concern was that “the work of industry-sponsored writers has the potential to introduce bias, affecting treatment decisions by doctors and, ultimately, patient care.”³⁸ Journal authors responding to a survey reported a 10.9% rate of ghostwriting in the *New Eng-*

land Journal of Medicine, a 7.9% rate in JAMA, a 7.6% rate in *PLoS Medicine*, a 4.9% rate in the *Annals of Internal Medicine*, and a 2% rate in *Nature Medicine*.³⁹ Cynthia E. Dunbar, MD, editor-in-chief of *Blood*, the journal of the American Society of Hematology, reported uncovering 3 ghostwritten manuscripts in which a pharmaceutical company employee should have been listed as an author.⁴⁰

Bias for Interventional Procedures

Now we turn to a more tacit institutional and specialty bias that exists in the US medical system in favor of interventional procedure-oriented medicine and against primary prevention. Let us consider the radiology department. As early as 1970, John Gofman, MD, PhD, expressed concern in *The Lancet* that the amount of radiation capable of doubling the risk of breast cancer is very low.⁴¹ In 2002, the Life Extension Foundation warned of the dangers of computed tomography (CT) and electron-beam radiation, noting that “a chest CT is equivalent to 400 chest x-rays, or 3.6 years of background radiation.”⁴² In 2007, Fred Mettler, MD, reported at the annual meeting of the National Council on Radiation Protection and Measurements that patients' radiation exposure had increased more than 750% in the previous 25 years.⁴³ The use of CT scanning in the United States increased at least 10% per year during that 25-year period, climbing from 3 million scans in 1980 to 60 million scans in 2005.⁴³ Dr Mettler was quoted as saying, “I don't think radiologists have a clue about how much this has grown.”⁴³

In 1995, the *American Journal of Roentgenology*, reflecting a different bias, reported that lower doses of radiation were sufficient for good CT image quality.⁴⁴ In 2001, editorials in the same journal criticized the excessive use of radiation⁴⁵ and asserted that “radiologists have been unaware or indifferent to the high dose of radiation dosage with CT scans.”⁴⁶

The American College of Radiology

acknowledged in 2007 that the expanded use of medical imaging would result in an increase in cancer cases, although the organization could not quantitate this increase.⁴⁷ However, a study by the National Cancer Institute reported that CT scanning performed during 2007 alone would eventually cause 29,000 new cases of cancer and 15,000 deaths.⁴⁸ An article published in JAMA in 2007 estimated the lifetime increased risk of cancer from a single 64-slice CT coronary angiogram as 1 in 466 for a 60-year-old woman.⁴⁹ Radiation from annual full-body CT screening examinations between ages 45 and 75 years has been estimated to result in a lifetime incidence of radiation-induced fatal cancer in 1 of 50 screened individuals.⁵⁰ This latter estimate assumes no additional lifetime radiation exposures.

So, do the biases of physicists, radiologists, and the owners of full-body or cardiac calcium-score CT scanners align together in a uniform science-based perspective dedicated to the pursuit of truth—or do their recommendations and conclusions tend to reflect their individual biases?

It is curious that Linus Pauling's shadow²¹ should cross this discussion of willful nonengagement regarding the dangers of CT radiation, because Pauling's second Nobel Prize, for peace, was related to his research on the health effects of radiation from atmospheric atomic bomb testing in the 1950s.

Remember Occam's Razor

The medical profession today is drowning in data. A necessary survival technique is to preselect the sources of one's information, beginning with attention to the biases of any source. A medical journal will have its own biases, as will each author, specialty, research institution, and funding corporation. Adapting the rule of Occam's razor, the simplest guide is to follow the economic interests of the various parties. If all these biases line up, more or less, along one vector, you are then in a better position to evaluate the usefulness of the reported

“facts” and data.

To evaluate a particular journal article, we should look at the provenance of the article (indicative of its inherent biases and eventual economic impact), the coherency of the scientific method, the biological plausibility of reported results, and the practical usefulness of the results. We all have biases—they are essential parts of who we are. The economic biases of institutions, journals, and authors tend to be stable over time. Thus, conducting a “pre-triage” of reading material is not as daunting as it may seem.

We will leave it to Dr Haffey^{1,3} to assess bias in the vascular/cardiology journals, which are more familiar terrain to him than to us. We would expect that he would find a bias for the economic interests of cardiologists, with a preference for interventional procedures over primary prevention.

Meeting the Challenge

The present letter has focused on primary prevention studies. We plan to present evidence on vitamin/nutritional interventions for secondary CVD prevention in a subsequent letter.

Dr Haffey's challenge¹ to produce studies of sufficient size and clarity to demonstrate the benefits of antioxidant orthomolecular treatment on primary prevention of CVD is a fair one. Part of this challenge is not to spend vast amounts of time and money to produce studies that fail to confirm the biological plausibility of a long trail of epidemiologic studies, prospective cohort studies, and small double-blind studies. Prospective, randomized open trials with blinded endpoint assessment may be the most efficacious type of study for the next decade. Counterintuitive findings in studies must meet and pass higher levels of scrutiny to overcome perceived levels of economic or specialty bias.

The obvious public health problems of cigarette smoking, obesity, and lack of exercise remain to be solved on a societal level. The reduction of trans fatty acids in the food chain is one recent success. It

will take time, thought, and considerable amounts of money to meet Dr Haffey's challenge.¹ We hope that will come to pass during our lifetimes.

John H. Juhl, DO

Touro College of Osteopathic Medicine, New York, New York
Physicians Health & Wellness, New York, New York

Gary L. Ostrow, DO, PC

Physicians Health & Wellness, New York, New York

References

1. Haffey TA. How to avoid a heart attack: putting it all together [letter]. *J Am Osteopath Assoc*. 2010;110(7):397-400.
2. Juhl JH, Ostrow GL, Gleyzer M, Firshein R, Kulick A, Gordon-Cohen B, et al. How to avoid a heart attack: putting it all together [letter]. *J Am Osteopath Assoc*. 2010;110(5):268-270.
3. Haffey TA. How to avoid a heart attack: putting it all together. *J Am Osteopath Assoc*. 2009;109(5 suppl 1):S14-S20.
4. Einvik G, Klemsdal TO, Sandvik L, Hjerkin EM. A randomized clinical trial on Ω -3 polyunsaturated fatty acids supplementation and all-cause mortality in elderly men at high cardiovascular risk. *Eur J Cardiovasc Prev Rehabil*. 2010;17(5):588-592.
5. Pottala JV, Garg S, Cohen BE, Whooley MA, Harris WS. Blood eicosapentaenoic and docosahexaenoic acids predict all-cause mortality in patients with stable coronary heart disease: the Heart and Soul study [published online ahead of print June 15, 2010]. *Circ Cardiovasc Qual Outcomes*. 2010;3(4):406-412.
6. Albert CM, Campos H, Stampfer MJ, et al. Blood levels of long-chain Ω -3 fatty acids and the risk of sudden death. *N Engl J Med*. 2002;346(15):1113-1118.
7. Saravanan P, Bridgewater B, West AL, O'Neill SC, Calder PC, Davidson NC. Omega-3 fatty acid supplementation does not reduce risk of atrial fibrillation after coronary artery bypass surgery: a randomized, double blind, placebo controlled clinical trial [published online ahead of print December 30, 2009]. *Circ Arrhythm Electrophysiol*. 2010;3(1):46-53.
8. Dangour AD, Allen E, Elbourne D, et al. Effect of 2-y Ω -3 long-chain polyunsaturated fatty acid supplementation on cognitive function in older people: a randomized double-blind, controlled trial [published online ahead of print April 21, 2010]. *Am J Clin Nutr*. 2010;91(6):1725-1732.
9. Yokoyama M, Origasa H, Matsuzaki M, et al; Japan EPA Lipid Intervention Study (JELIS) Investigators. Effects of eicosapentaenoic acid on major coronary events in hypercholesterolaemic patients (JELIS): a randomised open-label, blinded endpoint analysis. *Lancet*. 2007;369(9567):1090-1098.
10. Sanders KM, Stuart AL, Williamson EJ, et al. Annual high-dose oral vitamin D and falls and fractures in older women: a randomized controlled trial [published correction appears in *JAMA*. 2010;303(23):2357]. *JAMA*. 2010;303(18):1815-1822.
11. Dong Y, Stallman-Jorgensen JS, Pollock NK, et al. A 16-week randomized clinical trial of 2000 international units vitamin D3 supplementation in black youth: 25-hydroxyvitamin D, adiposity, and arterial stiffness [published online ahead of print July 21, 2010]. *J Clin Endocrinol Metab*. 2010;95(10):4584-4591.
12. Anderson JL, May HT, Home BD, et al; Inter-mountain Heart Collaborative (IHC) Study Group. Relation of vitamin D deficiency to cardiovascular risk factors, disease status, and incident events in a general healthcare population [published online ahead of print August 11, 2010]. *Am J Cardiol*. 2010;106(7):963-968.
13. Hopkins MH, Fedirko V, Jones DP, Terry PD, Bostick RM. Antioxidant micronutrients and biomarkers of oxidative stress and inflammation in colorectal adenoma patients: results from a randomized, controlled clinical trial [published online ahead of print March 3, 2010]. *Cancer Epidemiol Biomarkers Prev*. 2010;19(3):850-858.
14. Park E, Kyoung Park Y, Kim SM, Lee HJ, Kang MH. Susceptibility to oxidative stress is greater in Korean patients with coronary artery disease than healthy subjects [published online ahead of print October 28, 2009]. *J Clin Biochem Nutr*. 2009;45(3):341-346.
15. Schleicher RL, Carroll MD, Ford ES, Lacher DA. Serum vitamin C and the prevalence of vitamin C deficiency in the United States: 2003-2004 National Health and Nutrition Examination Survey (NHANES) [published online ahead of print August 12, 2009]. *Am J Clin Nutr*. 2009;90(5):1252-1263.
16. Osganian SK, Stampfer MJ, Rimm E, et al. Vitamin C and risk of coronary heart disease in women. *J Am Coll Cardiol*. 2003;42(2):246-252.
17. McRae MP. Vitamin C supplementation lowers serum low-density lipoprotein cholesterol and triglycerides: a meta-analysis of 13 randomized controlled trials. *J Chiropr Med*. 2008;7(2):48-58.
18. Kurl S, Tuomainen TP, Laukkanen JA, et al. Plasma vitamin C modifies the association between hypertension and risk of stroke. *Stroke*. 2002;33(6):1568-1573.
19. Stryer L. Biochemistry. 2nd ed. San Francisco, CA: WH Freeman & Company; 1981:187,192,231.
20. Knekt P, Ritz J, Pereira MA, et al. Antioxidant vitamins and coronary heart disease risk: a pooled analysis of 9 cohorts. *Am J Clin Nutr*. 2004;80(6):1508-1520.
21. West A. Vitamin C: how much is too much? How much is too little? *Holistic Primary Care*. Winter 2004;9-10.
22. Heitzer T, Just H, Munzel T. Antioxidant vitamin C improves endothelial dysfunction in chronic smokers. *Circulation*. 1996;94(1):6-9. <http://circ.ahajournals.org/cgi/content/full/94/1/6>. Accessed November 3, 2010.

(continued)

23. Timpson NJ, Forouhi NG, Brion MJ, et al. Genetic variation at the SLC23A1 locus is associated with circulating concentrations of L-ascorbic acid (vitamin C): evidence from 5 independent studies with >15,000 participants [published online ahead of print June 2, 2010]. *Am J Clin Nutr*. 2010;92(2):375-382.
24. Pocobelli G, Peters U, Kristal AR, White E. Use of supplements of multivitamins, vitamin C, and vitamin E in relation to mortality [published online ahead of print July 13, 2009]. *Am J Epidemiol*. 2009;170(4):472-483. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2727181/>. Accessed November 3, 2010.
25. Bates CJ, Hamer M, Mishra GD. Redox-modulatory vitamins and minerals that prospectively predict mortality in older British people: the National Diet and Nutrition Survey of people aged 65 years and over [published online ahead of print September 1, 2010]. *Br J Nutr*. 2011;105(1):123-132.
26. Rautiainen S, Akesson A, Levitan EB, Morgenstern R, Mittleman MA, Wolk A. Multivitamin use and the risk of myocardial infarction; a population-based cohort of Swedish women [published online ahead of print September 22, 2010]. *Am J Clin Nutr*. 2010;92(5):1251-1256.
27. Huang HY, Appel LJ. Supplementation of diets with alpha-tocopherol reduces serum concentrations of gamma- and delta-tocopherol in humans. *J Nutr*. 2003;133(10):3137-3140.
28. Chambers JC, Obeid OA, Kooner JS. Physiological increments in plasma homocysteine induce vascular endothelial dysfunction in normal human subjects. *Arterioscler Thromb Vasc Biol*. 1999;19(12):2922-2927.
29. Molloy AM, Daly S, Mills JL, et al. Thermolabile variant of 5,10-methylenetetrahydrofolate reductase associated with low red-cell folates: implications for folate intake recommendations. *Lancet*. 1997;349(9065):1591-1593.
30. Wilcken DEL, Wilcken B, Dudman NPB, Tyrrell PA. Homocystinuria—the effects of betaine in the treatment of patients not responsive to pyridoxine. *N Engl J Med*. 1983;309(8):309-448-453.
31. 5-methyltetrahydrofolate [monograph]. *Altern Med Rev*. 2006;11(4):330-337.
32. Wang X, Qin X, Demirtas H, et al. Efficacy of folic acid supplementation in stroke prevention: a meta-analysis. *Lancet*. 2007;369(9576):1876-1882.
33. de Jager J, Kooy A, Lehert P, et al. Long term treatment with metformin in patients with type 2 diabetes and risk of vitamin B-12 deficiency: randomised placebo controlled trial. *BMJ*. 2010;340:c2181.
34. MacDonald GP. Was the FDA misled by JUPITER? *J Am Osteopath Assoc*. 2010;110(8):424-425.
35. Ridker PM, Danielson E, Fonseca FAH, Genest J, Gotto AM, Kastelein JJP, et al; for the JUPITER Study Group. Rosuvastatin to prevent vascular events in men and women with elevated C-reactive protein. *N Engl J Med*. 2008;359(21):2195-2207. <http://content.nejm.org/cgi/reprint/359/21/2195.pdf>. Accessed November 4, 2010.
36. Home PD, Pocock SJ, Beck-Nielsen H, et al; RECORD Study Team. Rosiglitazone evaluated for cardiovascular outcomes in oral agent combination therapy for type 2 diabetes (RECORD): a multicentre, randomized, open-label trial [published online ahead of print June 6, 2009]. *Lancet*. 2009;373(9681):2125-2135.
37. Psaty BM, Prentice RL. Minimizing bias in randomized trials: the importance of blinding. *JAMA*. 2010;304(7):793-794.
38. Wilson D, Singer N. Ghostwriting is called rife in medical journals. *New York Times*. September 11, 2009:B5. <http://www.nytimes.com/2009/09/11/business/11ghost.html>. Accessed November 3, 2010.
39. Wislar J, Flanagan A, Fontanrosa P, DeAngelis CD. Prevalence of honorary and ghost authorship in 6 general medical journals, 2009. Paper presented at: International Congress on Peer Review and Biomedical Publication; September 10, 2009; Vancouver, BC.
40. Singer N, Wilson D. Unmasking the ghosts. *New York Times*. September 18, 2009.
41. Faloony W. Lethal danger of CT scans. *Life Extension Magazine*. August 10, 2010. http://www.lef.org/magazine/mag2010/aug2010_Lethal-Danger-of-CT-Scans_01.htm. Accessed November 3, 2010.
42. Mitchell T. Body scans—do you know the risk? *Life Extension Magazine*. November 2001. http://www.lef.org/magazine/mag2001/nov2001_report_scans_01.html. Accessed December 11, 2010.
43. Wiesel S, Schoene M, Nelson C. Shocking rise in medical radiation exposure. *Back Letter*. 2007;22(7):75.
44. Mayo JR, Hartman TE, Lee KS, Primack SL, Vedal S, Muller NL. CT of the chest: minimal tube current required for good image quality with the least radiation dose. *AJR Am J Roentgenol*. 1995;164(3):603-607.
45. Rogers LF. Radiation exposure in CT: why so high? [editorial]. *AJR Am J Roentgenol*. 2001;177(2):277.
46. Nickoloff EL, Alderson PO. Radiation exposures to patients from CT: reality, public perception, and policy [editorial]. *AJR Am J Roentgenol*. 2001;177(2):285-287.
47. Amis ES Jr, Butler PF, Applegate KE, et al; American College of Radiology. American College of Radiology white paper on radiation dose in medicine. *J Am Coll Radiol*. 2007;4(5):272-284.
48. Berrington de Gonzalez A, Mahesh M, Kim KP, et al. Projected cancer risks from computed tomographic scans performed in the United States in 2007. *Arch Intern Med*. 2009;169(22):2071-2077.
49. Dachs RJ, Graber MA, Darby-Stewart A. Cancer risks associated with CT scanning. *Am Fam Physician*. 2010;81(2):111.
50. Brenner DJ, Elliston CD. Estimated radiation risks potentially associated with full-body CT screening [published online ahead of print July 23, 2004]. *Radiology*. 2004;232(3):735-738.

Dr Haffey was shown this letter and declined to comment.

Communication by Degrees

To the Editor:

There has been considerable discussion recently of the advisability of changing the DO degree. Good-willed, well-intentioned DOs have strongly suggested a change, and equally well-meaning and competent osteopathic physicians have opposed it. Admittedly, there are a few—very few, I believe—MD-wannabes, and any discussion of degree modification would not satisfy this extreme group; I am not addressing that here.

I would like to explore this topic as a communication problem, a different perspective than usually offered.

But what is a degree anyhow? It is the academic title conferred after completion of a prescribed course of study. But it does not tell anything about the quality of the bearer's work. Mostly, we are dealing with the abbreviation of the academic degree: initials that communicate instantly the professional field of the bearers and the actual academic degree and license (eg, PharmD, doctor of pharmacy; DPM, doctor of podiatric medicine). It is a strong communication tool. What connotation that degree communicates is another story. Much depends on the background and experiences of the reader or listener. So, in the long run, we are really concerned about connotation of the abbreviation. Does changing a degree change its connotation?

Historically, we changed our degree some years ago from *doctor of osteopathy* to *doctor of osteopathic medicine*, but maintained DO as its abbreviation. The disagreement is really about the abbreviation.

Let's look at the arguments. One of the ubiquitous premises is that several professions changed their degrees

without difficulty. But is that analogous to the osteopathic situation? No, it is not. All the degree changes were *within the same professional group*, and with almost unanimous agreement of its practitioners.

Lawyers, for example, had been using (sparingly) their actual academic degree, LLB, or the commoner nondegree, Esquire. In order to eliminate these unacceptable designations, establish uniformity, and eliminate any confusion, the legal profession adopted the juris doctor (JD) for all attorneys, allowing every lawyer, both in practice and those to follow, to use that degree. It was within the same profession.

Pharmacists did not really change their degree—they upgraded their professional classification. It was realized that the profession of pharmacy was taking on a new and wider role in clinical specialization and dealing with patients clinically more and more. They were becoming involved with patient counseling, compliance, and education. On the basis that this increased emphasis met the standards for a doctorate, from about 1994 forth, all colleges of pharmacy conferred the PharmD degree—and holders of the BS in Pharmacy were not entitled to use the PharmD designation. A different situation.

Similar descriptions apply to the other professions that have been mentioned as changing their degrees.

However, in the healing arts, there are 2 professions: Allopathic Medicine and Osteopathic Medicine. Both are recognized by each other, by all government agencies, and by almost all of the population. These are 2 separate (not as much as previously), rather distinct, almost parallel, and in some aspects “competitive” professions offering complete healthcare to the public. Most practitioners in each group want the public to be able to recognize what they are instantly—by means of a degree. Would changing the degree alter the public’s conception of what each is or does? Hardly. It would not alter what I, and many others, have experienced after

osteopathic medicine began to gain a foothold: Hearing of Dr So-and-so, the puzzled answer (an actuality) was, “Who? Oh, you mean the osteopath!” No change of degree would change ignorant or prejudiced mind-sets.

What it would do is create a new problem—explaining to believers and non-believers alike what the new ABC is (I use that to avoid endorsing any degree change and to increase recognition of the problem). What is an ABC? Is it the same as the DO? Or is it the same as an MD? Or is it something new? We would have to explain carefully this change to all our patients (with patience!)—taking a lot of valuable time. It will not be “Oh, my doctor is now an ABC—that’s great!” And we would not be able reach all those out there we do not reach now.

But it would create more questions, more doubts, and more controversy among the rest of the world. We’ve already arrived—why stir things up?

Let’s look at the 1 time our profession changed its degree. When California offered DOs an MD degree for \$65, those who accepted became MDs. At last! But just to make sure, the California Medical Association did not integrate them into the medical society, but instead isolated (try Ghetto-ized) them into a single “District” society that was statewide and contained all, and only, former DOs—thereby limiting their possible influence in any important matters. It was no longer, “Oh, those DOs,” it was “Oh, that’s just District X talking.” What did we gain except loss of identity?

Connotations, assumptions, and lack of knowledge would not be changed by the communication of a new degree. Only new problems would be created, including possible snide offerings of any of our “enemies.” So, it serves no real communication purpose.

A homely analogy: zebras, seeing the greater popularity and acceptance of horses and the many ways they resembled horses, might opt to change their names to “horses.” They would still be zebras but would continue calling themselves “horses.” Those people who

knew what a horse was and what a zebra was would be totally confused. Those who didn’t know what a horse was and what a zebra was really wouldn’t care.

Allow me a purely personal commentary. For the past 65 years I have carried the DO degree, while the profession went from isolation, prejudice, discrimination, exclusion, and lack of recognition and acceptance to today’s position of widespread acceptance and recognition in so many quarters (allopathic hospitals, MD medical schools, the US Armed Forces, almost every health department, all government agencies and, to a much greater extent than before, even the public). All this on the DO degree. For myself, I would not trade my DO degree—even for an MD degree—for anything. There will always be disbelievers and skeptics. Better to build on the great progress that has been made over the past 50-plus years.

FOREVER, I want to be able to sign my name, as I always have, with so much recognition, acceptance, and success—

Arnold Melnick, DO
Aventura, Florida