



E & N News to Use *for cancer patients, survivors and caregivers*

EXERCISE & NUTRITION during/after* **CANCER**

CURRENT PEER-REVIEWED MEDICAL LITERATURE and EXPERT COMMENTARY
from **RELIABLE SOURCES** and **DR. BLEYER**

*Studies on cancer prevention are included if they have special relevance to cancer survivors

August 2009

The 12 months of 2008 *E&N News* are now available as a **year summary** for downloading, either for exercise or nutrition (with each including reports on the combination of exercise and nutrition) at www.defeatcancer.info. Both versions include executive summaries and are indexed and bookmarked.

E&N News is now listed as **one of 7 resources recommended by MD Anderson Cancer Center** in the *Complementary Therapies, General* category and endorsed by the Cancer Patient Education Network of the National Cancer Institute. The MD Anderson Cancer *Complementary/Integrative Medicine Educational Resources* resource (www.mdanderson.org/departments/CIMER) is rated #1.

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► Exercise and Nutrition

Lifestyle choices after colorectal cancer diagnosis found to affect recurrence risk

People with colon cancer who walked at a moderate pace for one hour six days a week had a 50% decreased risk of having a recurrence, and the results were consistent no matter which factors were assessed—body mass index, number of positive lymph nodes, treatment, age, or baseline performance status.

Rabiya S. Tuma, PhD
Oncology Times, August 10, 2009, pp 37-39

SAN FRANCISCO—It is widely appreciated that lifestyle choices can affect the likelihood that an individual will develop colorectal cancer. Now a **growing body of data show that lifestyle choices after a diagnosis of colorectal cancer are associated with the risk of disease recurrence and death**, researchers reported at the Gastrointestinal Cancers Symposium cosponsored by the American Gastroenterological Association Institute, the American Society of Clinical Oncology, the American Society for Radiation Oncology, and the Society of Surgical Oncology.

“This information is incredibly important,” said **Jennifer C. Obel, MD**, a member of ASCO’s Communications Committee, who is Attending Physician and Assistant Professor at the NorthShore University Health System in Evanston, IL, who was not involved in the studies. “I think what our patients most care about is ‘What can I do to improve my health?’ This is something they can do.” Pointing to the details of the work presented by **Jeffrey Meyerhardt, MD, MPH**, Assistant Professor of Medicine at **Brigham and Women’s Hospital** and **Dana-Farber Cancer Institute**, Dr. Obel continued, “He found that patients who walked at a moderate pace for one hour six days a week had a 50% decreased risk of having recurrent colon cancer. That is a very important clinical finding.” **Leonard Saltz, MD**, Attending Physician at **Memorial Sloan-Kettering Cancer Center** in New York, who was a coauthor on some of the studies, said in an interview that he was surprised these data had panned out: “I thought that for people who don’t have cancer that modifying diet and exercise would make a difference. But what Jeff’s data say is that good diet and good exercise improve the body’s ability to eradicate small-volume disease.” Explaining further, he noted that disease recurrence occurs due to regrowth of tumor cells left behind after surgery and chemotherapy. The fact that physical exercise and a moderate diet were associated with a reduced risk of recurrence and death suggest that a well-fed, exercised body is actually better able to protect itself against those remaining cells than a sedentary one with a poorer diet is—“That is kind of interesting,” Dr. Saltz said.

Six Hours a Week

Dr. Meyerhardt presented observational data gathered from several sources, including a prospective companion study that enrolled individuals who were already participating in a randomized controlled Cancer and Leukemia Group B trial. In that study, CALGB 89803, patients with Stage III colorectal cancer were assigned to weekly fluorouracil and leucovorin with or without irinotecan. (Primary results from the trial showed no benefit with the addition of irinotecan.)

To begin to understand the impact of post-diagnosis diet and physical activity on the risk of recurrence and overall survival, **Charles Fuchs, MD**, Director of the Gastrointestinal Malignancies Program at **Dana-Farber**, designed the prospective companion study in which patients completed questionnaires three months after starting chemotherapy and six months after completing chemotherapy. Of 1,177 patients eligible for the companion study, 832 completed both questionnaires. Even modest amounts of regular physical activity had a significant impact on the risk of recurrence, with the magnitude of benefit increasing with increasing activity up to 18 metabolic equivalent task hours (MET-hours) per week. People who reported as little as three MET-hours a week—which is equivalent to one hour of walking at a moderate pace of two to three miles a hour, had an approximately 10% drop in their risk of recurrence, relative to those who had less than 3 MET-hours a week. **That reduction in risk climbed to 50% for individuals who reported 18 MET-hours per week, which was equivalent to six hours of walking at a moderate pace during the week.** Additional exercise above that amount was not associated with a further reduction in risk of recurrence.

Physical activity was also associated with substantial gains in overall survival. People who participated in 3 to 8.9 MET-hours of physical activity a week had a 15% reduction in risk of death relative to those reporting less than three MET-hours. Improvements in survival increased with increasing activity up to 27 MET-hours a week, with individuals reporting between 9 and 26.9 MET-hours a week showing a 29% reduction in the risk of death and those above 27 MET-hours gaining a 69% risk reduction. These results were consistent whether you looked at body mass index [BMI], gender, number of positive lymph nodes, treatment arm, age, and baseline performance status.

Nurses' Health Study

To validate this observation, Dr. Meyerhardt and colleagues turned to the Nurses' Health Study, the longitudinal cohort study of 121,000 nurses that was started in the 1970s. Participants complete questionnaires every two years, including data on physical activity and diet, and remain in the study even after a cancer diagnosis. Examining data from 573 women who were diagnosed with Stage I-III colorectal cancer, the investigators found that **women who engaged in 18 MET-hours of physical activity a week or more had a 61% reduction in risk of disease-specific mortality** and a 52% reduction in all-cause mortality relative to individuals who reported less than three MET-hours per week, after adjusting for tumor stage, the number of positive lymph nodes, and other known risk factors. When the researchers examined the prediagnosis activity for these women, they found that increasing physical activity did not affect colorectal cancer-specific mortality. "That implies that the **physical activity after diagnosis was more important towards prognosis,**" Dr. Meyerhardt said.

Moderate Diet Lowers Risk, Weight Loss Does Not

Dr. Meyerhardt and colleagues also examined the impact of post-diagnosis diet on clinical outcomes, focusing on diet patterns rather than individual food items. The two patterns they considered were a Western pattern diet, which is characterized by a higher intake of red meat, processed meat, refined grains, sweets, desserts, French fries, and high-fat dairy products; and a prudent diet, which is characterized by a higher intake of vegetables, fruits, legumes, whole grains, fish, and poultry. The two patterns are not mutually exclusive—"You can eat at McDonald's every day and still eat a lot of fruits and vegetables," Dr. Meyerhardt said. Individuals in the CALGB 89803 companion study who were in the highest quintile for a Western pattern diet had nearly a four-fold increase in risk of disease recurrence or death compared with those in the lowest quintile. Patients in the highest quintile consumed about six servings of red meat a week compared with only two for those in the lowest quintile, six servings of refined grains a day compared with two, and 2.5 sugary desserts a day compared with less than one. "The data imply that **you don't need to necessarily avoid everything in a Western pattern diet, but you do need to take it in moderation,**" he said. Interestingly, increasing intake of a prudent diet did not appear to be associated with risk of recurrence. Meanwhile, several groups have been looking at the impact of body mass index on the risk of recurrence and death. For example, **James Dignam, PhD**, pooled data from 4,300 participants in various **National Surgical Adjuvant Breast and Bowel Project** randomized controlled trials and found that individuals who had a BMI above 35 mg/m² or higher had a statistically significantly worse outcome than those whose BMI fell within the normal or overweight range. Dr. Meyerhardt's group revisited the issue using data from the CALGB 89803 study data, updating individuals' BMI between the first and second questionnaires, and found similar results. **Both studies showed that a BMI above 35 mg/m² was associated with an approximately 25% increased risk of recurrence or death.** Although the increased risk may not be as large as the change in risk associated with physical activity, it is important to realize that the number of very overweight individuals in the United States has doubled over the past three decades, so a lot of individuals will be affected by the risk, Dr. Meyerhardt said. **Post diagnosis weight loss or gain, based on changes in BMI from the first to second questionnaires in participants in CALGB 89803, did not show an association with outcomes.**

What to Recommend?

All of the data described are observational and thus are not absolutely conclusive. But there is no down side to a healthy diet and exercise, experts agreed. "It is probably reasonable to recommend to your patients, who are able, to engage in physical activity," Dr. Meyerhardt concluded, noting that the association with physical exercise and outcome is the most consistent and well-studied. As for diet recommendations, he said, "a healthy diet has implications beyond colon cancer recurrences. If you go through treatment for colon cancer it is probably a good idea to maintain a healthy diet for heart and other conditions."

Dr. Bleyer:

- ☑ Dr. Meyerhardt has convincingly summarized the accumulated data since the initial report in 2005 that show unequivocal benefit of exercise in reducing the rate of cancer recurrence and mortality in patients with colorectal cancer
 - ☑ The update demonstrates the benefit occurred regardless of the amount of exercise patients did before their diagnosis, how much they weighed before diagnosis, their age (see next report) or the severity of the cancer when they were diagnosed
 - ☑ The update also indicates that patients with colorectal cancer can make their prognosis worse by doing less exercise or gaining more weight after diagnosis
 - ☑ In the totality of the data summarized, I don't know of more convincing evidence of how **E&N** affects cancer recurrence and not just improves quality of life and/or other morbid health conditions
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Changing the picture for senior cancer survivors

Plans to control health care costs and improve care need to consider the growing population of seniors who are cancer survivors

By Karen Collins, MS, RD, CDN

Washington, D.C. - August 17, 2009 :: Staff infoZine - American Institute for Cancer Research

This group is not only at risk of a secondary cancer, but also of functional decline due to loss of strength or balance and other health conditions. Research suggests that weight control, regular moderate physical activity and healthy eating may reduce cancer survivors' risk of cancer, improve quality of life and reduce the burden of functional decline. Now research also is identifying ways to help survivors make healthy lifestyle changes.

Cancer survivors are at risk population:

Even cancer survivors without recurrence may experience lasting effects of the disease and its treatment. This can include increased risk of heart disease, high blood pressure, diabetes or osteoporosis as well as reduced fitness and strength.

Overall, studies suggest that cancer patients tend to make few if any improvements in eating or activity habits or may make changes soon after diagnosis but not maintain them. Yet among breast cancer survivors, those who gain less weight show greater survival. Regular moderate physical activity may enhance survival and help counteract the decreases in functioning and quality of life that otherwise come with loss of strength and fitness.

Interventions at work

Programs to teach and support healthier lifestyles can successfully address these problems. Researchers have been developing and testing home-based programs delivered by mail, telephone or Internet to improve participation by older adults.

Initial studies often showed habits improving and then reverting back to usual when the program was over. A program from researchers at **Duke University added methods to participants' materials to match their readiness to change and personality**. Information also included testimonials of similar survivors who successfully made lifestyle changes. The program is ongoing but short-term data shows increased physical activity, improved diet and slight reduction of overweight.

Focus on function

Another recent study added efforts to improve physical functioning among cancer survivors who were at least 65 years old and at least five years past diagnosis. All the participants were overweight or obese and sedentary. This 12-month study used print materials and telephone counseling to encourage healthier lifestyles. The goals included daily moderate activity, eating more vegetables and fruits, eating less saturated fat, modest weight loss, and 15 minutes of lower body strength-training three times weekly. A "wait-list" control group made no changes.

Participants averaged less than half the strength-training target, but compared to the control group who showed significant drop in a score of basic physical function, **they showed almost no detectable decrease in the quality of life**. Participants also made modest improvements in other lifestyle goals, while the wait-list group had no change.

We can view these results pessimistically or optimistically. Even this well-designed, personalized program still resulted in less than one in five participants meeting recommended walking or vegetable and fruit consumption targets. Although the program generally did not improve physical functioning, it did reduce the decline in physical function often seen with age and in many cancer survivors. **Delivered at a cost of about a thousand dollars per person, these could be dollars well spent**. Because some cancer survivors have physical limitations, efforts to improve physical function should be evaluated by each individual's physician before they jump in.

Dr. Bleyer:

- ☑ Our most elderly survivors often get "short changed" in studies of benefit of **E&N** since we don't expect them to be able to exercise or change their lifestyles as much as can be achieved in younger patients
 - ☑ This report summarizes the evidence that this opinion is not warranted since, with appropriate methods, support and some financial investment (e.g. *about \$1000*), many elderly patients can significantly change their lifestyles and receive some benefit
 - ☑ In the prior report, the benefit of **E&N** in colorectal patients was independent of age; even the most elderly patients demonstrated benefit
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► Exercise

Weight lifting in women with breast-cancer-related lymphedema

[In breast-cancer survivors with lymphedema, a clinical trial of weight lifting decreased lymphedema and reduced symptoms, opposite of what was expected from prior bias and practice](#)

Kathryn Schmitz, PhD, MPH, Rehana Ahmed, MD, PhD, Andrea Troxel, ScD, Andrea Cheville, MD, Rebecca Smith, MD, Lorita Lewis-Grant, MPH, MSW, Cathy Bryan, MEd, Catherine Williams-Smith, BS, Quincy Greene
N Engl J Med Volume 361:664-673 August 13, 2009

From the University of Pennsylvania School of Medicine and Abramson Cancer Center, University of Minnesota Medical School, Minneapolis and the Mayo Clinic, Rochester, Minnesota

Background Breast-cancer survivors with lymphedema may limit the use of their affected arm out of fear and on the basis of guidance from commonly accessed cancer-information internet websites that suggest that risk of lymphedema is decreased by avoiding lifting children, heavy bags, or other objects with the affected arm. Although this advice is intended to prevent harm, adherence to these precautions may limit physical recovery after breast-cancer surgery, alter activities, and adversely affect employment. Conversely, a program of controlled exercise through weight lifting may increase the physical-work capacity of the affected arm, thereby protecting it from injury sustained during common daily activities.

Methods 141 breast-cancer survivors with stable lymphedema of the arm were randomized to a program of twice-weekly, progressive weight lifting. The primary outcome was the change in arm and hand swelling at 1 year, as measured through displaced water volume of the affected and unaffected limbs. Secondary outcomes included the incidence of exacerbations of lymphedema, number and severity of lymphedema symptoms, and muscle strength. Participants were required to wear a well-fitted compression garment while weight lifting.

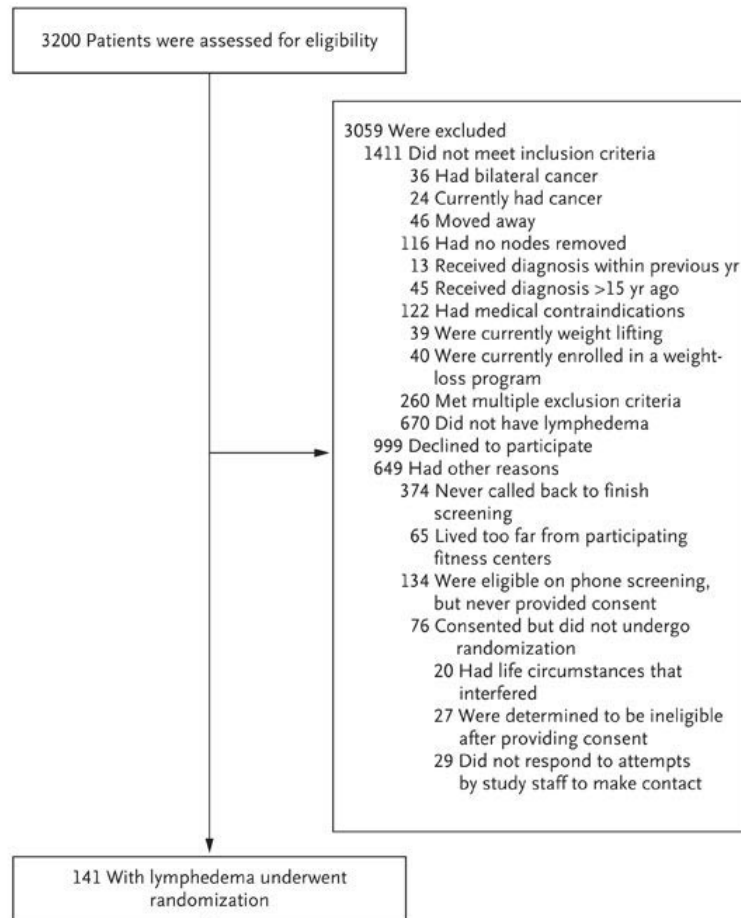
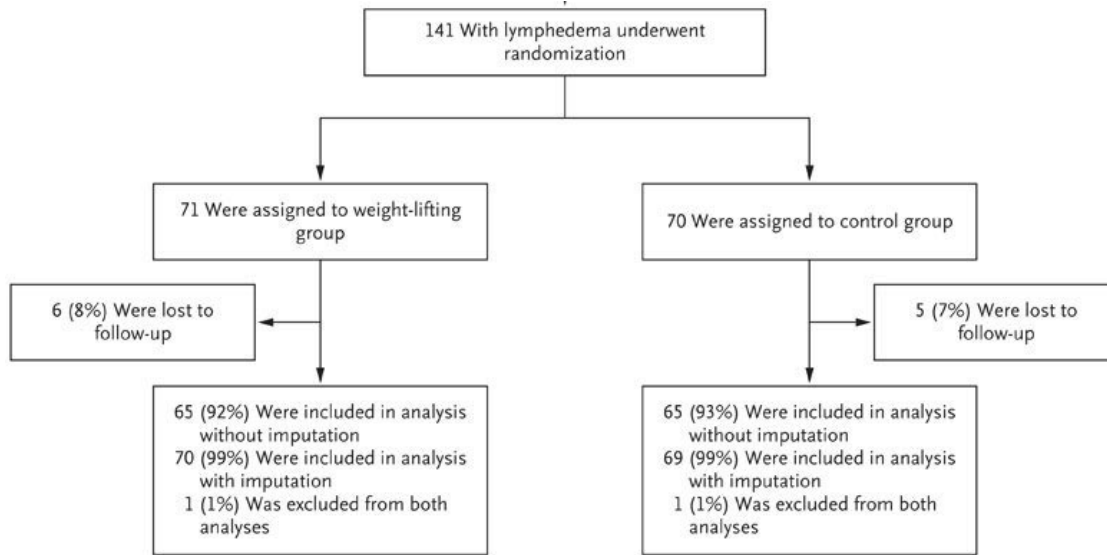


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Results The proportion of women who had an increase of 5% or more in limb swelling was similar in the weight-lifting group (11%) and the control group (12%) (cumulative incidence ratio, 1.00; 95% confidence interval, 0.88 to 1.13). As compared with the control group, the weight-lifting group had greater improvements in self-reported severity of lymphedema symptoms (P=0.03) and upper- and lower-body strength (P<0.001 for both comparisons) and a lower incidence of lymphedema exacerbations as assessed by a certified lymphedema specialist (14% vs. 29%, P=0.04). There were no serious adverse events related to the intervention.

Table 2. Strength, Anthropometric, Diet, and Physical-Activity Data at Baseline and 12 Months, According to Study Group.*

Variable	Baseline			P Value	12 Mo			P Value	% Change between Baseline and 12 Mo						
	Weight Lifting		Control		Weight Lifting		Control		Weight Lifting		Control	P Value			
	no. with data	mean ±SD	no. with data		mean ±SD	no. with data	mean ±SD		no. with data	mean ±SD	no. with data		mean ±SD		
Bench press, maximum (lb)	70	43±16	70	39±13	0.21	56	53±18	63	39±12	<0.001	56	29.4±36.5	63	4.1±24.1	<0.001
Leg press, maximum (lb)	70	182±64	68	162±58	0.09	59	232±66	63	165±57	<0.001	59	32.5±33.2	62	7.6±29.9	<0.001
Weight (kg)	71	82.4±16.6	70	79.4±17.6	0.18	65	80.0±15.6	65	79.0±16.9	0.66	65	-1.0±3.7	65	-0.4±4.3	0.47
BMI†	71	31.0±6.2	70	29.9±6.6	0.21	65	30.0±5.7	65	29.9±6.5	0.70	65	-1.0±3.7	65	-0.4±4.3	0.42
Body fat (%)	71	40.1±5.7	69	39.5±5.2	0.42	65	39.6±6.3	64	39.9±5.3	0.90	65	-0.3±5.7	63	-0.1±3.3	0.19
Fat mass (kg)	71	33.3±10.3	69	31.8±10.6	0.27	65	32.0±10.1	64	31.9±10.5	0.87	65	-1.2±8.0	63	0.6±8.1	0.27
Lean mass (kg)	71	50.3±7.7	69	49.1±7.7	0.29	65	49.1±7.3	64	48.4±7.5	0.63	65	-1.0±3.4	63	-1.1±3.6	0.67
Diet (kcal per day)	70	1835±1319	67	1610±1131	0.36	60	1532±679	63	1348±632	0.08	60	-1.1±39.2	61	-1.3±58.3	0.36
Physical-activity level (MET-min/wk)‡	54	1954±2423	61	2339±2589	0.49	52	2397±2548	57	1740±1935	0.20	48	2.8±16.8	57	-0.8±16.6	0.26

* To convert bench and leg press values to kilograms, multiply by 0.45359. MET denotes metabolic equivalent.
 † The body-mass index (BMI) is the weight in kilograms divided by the square of the height in meters.
 ‡ The percent changes over the 12-month study period were calculated from natural-log-transformed physical-activity levels to improve the normality of the distribution.

Conclusions In breast-cancer survivors with lymphedema, slowly progressive weight lifting had no significant effect on limb swelling and resulted in a decreased incidence of exacerbations of lymphedema, reduced symptoms, and increased strength.

Table 3. Lymphedema Outcomes at 12 Months, According to Study Group.*

Variable	Weight Lifting		Control		Cumulative Incidence Ratio or Mean Difference (95% CI)†	P Value‡
	no. of patients with data	value	no. of patients with data	value		
Change in interlimb volume difference						
≥5% increase — no. (%)	70	8 (11)	69	8 (12)	1.00 (0.88 to 1.13)	1.00
≥5% decrease — no. (%)	70	13 (19)	69	15 (22)	0.96 (0.81 to 1.14)	0.68
Mean interlimb volume discrepancy between baseline and 12 mo (percentage points)	70	-0.69±5.87	69	-0.98±7.31	-0.29 (-1.94 to 2.51)	0.80
Exacerbation — no. (%)	65	9 (14)	65	19 (29)	0.47 (0.23 to 0.97)	0.04
Change in no. of symptoms reported between baseline and 12 mo§	70	-1.81±2.16	69	-1.17±1.94	-0.63 (-1.32 to 0.06)	0.07
Change in severity of symptoms between base- line and 12 mo§	70	-0.51±0.80	69	-0.22±0.71	-0.29 (-0.54 to -0.03)	0.03

* Plus-minus values are means ±SD.

† The mean difference is given for the weight-lifting group as compared with the control group for the difference in interlimb volume discrepancies (the interarm difference over time) and changes in number and severity of symptoms. The cumulative incidence ratio is given for the weight-lifting group as compared with the control group for differences in percentages.

‡ P values were calculated with the use of Fisher's exact test for between-group comparisons of percentages and the Wilcoxon rank-sum test for between-group comparisons of the difference in interlimb volume discrepancies and changes in number and severity of symptoms.

§ Data were reported by patients regarding 14 symptoms: rings too tight, watch too tight, bracelets too tight, clothing too tight, puffiness, knuckles not visible, veins not visible, skin feels leathery, arm feels tired, pain, pitting, swelling after exercise, difficulty writing, or other. The change in severity of symptoms is the mean of the changes in severity for all 14 symptoms, with the possible severity score for each ranging from 0 (no symptom) to 4 (very severe).

Dr. Bleyer:

- ☑ E&N News previously reported the evidence that weight lifting and other upper extremity exercise after mastectomy did not increase the incidence of lymphedema and may actually decrease it
- ☑ This clinical trial goes significantly further in demonstrating that women who already have lymphedema benefit from exercise including weight lifting by the affected extremity and reverse prior thinking that let to recommendations of avoidance of exercise of the affected or potentially affected arm
- ☑ Weight lifting offers additional benefits particularly relevant to breast-cancer survivors, including control of body fat and improved functional outcomes and bone health.
- ☑ This study illustrates the difficulty in conducting clinical trials: 3200 women with breast cancer had to be screened to find 1648 eligible subjects
- ☑ More problematic, 92% of the eligible patients either declined to participate (999 women) or had other reasons not to participate (649 woman), despite that fact that there was a 50:50 chance of being enrolled in the exercise regimen and if randomized to it would have provided a free 1-year membership in a local fitness center and required twice weekly sessions at the center, the first 3 months of which would have included supervision by a certified trainer
- ☑ This study also shows, once again, that logic not based on scientific evidence, especially if not prospectively tested in clinical trials, should be recognized as tradition, hearsay, custom, habit, or myth and not be accepted as wisdom

A weighty matter — Lifting after breast cancer

[Dr. Demark-Wahnefried, an expert on E&N and cancer, comments on the prior article published in the New England Journal of Medicine, widely recognized as the most prestigious medical journal](#)

Wendy Demark-Wahnefried, PhD, RD
N Engl J Med 361:710-711 August 13, 2009

In 1996, the Canadian Medical Association Journal featured a cover story entitled "Breast-cancer survivors begin to challenge exercise taboos." This story appeared during an era when lymphedema was reported in up to 62% of women treated for breast cancer, and patients were cautioned against making repetitive arm movements and lifting more than 10 to 15 lb (4.5 to 6.8 kg). The article also chronicled the fledgling research efforts of a group of Canadian investigators who were exploring progressive resistance training (exercise regimens that promote gradual increases in intensity, frequency, and load to improve muscle strength) as a means to improve physical function and the quality of life, testing the hypothesis that such exercise may actually reduce the risk of lymphedema or at least

not exacerbate it. At that time, there was speculation about the potential benefits of progressive resistance training on the lymphatic system, yet the Canadian research was in direct opposition to clinical practice that advocated limitations on weight lifting.

The concern about weight lifting has largely been based on epidemiologic studies of women who had undergone axillary-node dissection or radiation therapy, in which significant associations between infection or injury to the affected arm and lymphedema were reported.⁵ Although injury and infection are different, they unfortunately were grouped together in the analysis. Furthermore, in translating these data to simple "patient-friendly" steps for the prevention of lymphedema, a strategy of avoidance, rather than rehabilitation, was adopted. Three widely disseminated recommendations cautioned against vigorous, repetitive arm movements ("[do not engage in] scrubbing, pushing, pulling, and hammering"), heavy lifting ("never carry heavy handbags and grocery bags . . . [and] do not lift more than 15 pounds"), and resistance training exercises that "overtire an arm at risk." Though the recommendations advocated exercise, suggested activities were limited to walking, swimming, light aerobics, bike riding, and "specially designed ballet or yoga." But what should a woman do if, after her treatment, she returns home to a houseful of toddlers or has to push a mop for a living?

In the August 13 issue of the *New England Journal of Medicine*, Schmitz et al. (cf. prior report) report the findings of the **largest randomized, controlled trial to date** (ClinicalTrials.gov number, NCT00194363

[ClinicalTrials.gov]) assessing whether progressive resistance training adversely affects arm and hand swelling among women with a history of breast cancer and clinically confirmed lymphedema, a group at high risk for flare. As compared with patients assigned to usual care, women assigned to twice-weekly, whole-body resistance training involving progressive weight bearing and progressive numbers of exercise sets (performed while wearing a custom-fitted compression garment) did not have a significant increase in limb swelling, and had greater improvements in self-reported severity of lymphedema symptoms and in upper- and lower-body strength as compared with controls, as well as a lower incidence of confirmed exacerbations of lymphedema.

The present report makes a substantial contribution to the available evidence to support weight-lifting intervention. Previous studies, most involving breast-cancer patients who did not have preexisting lymphedema, showed that **progressive resistance training, or exercise regimens that included progressive resistance training, resulted in several benefits: improved flexibility, strength, physical function, and quality of life, and perhaps most surprisingly, the ability to complete the scheduled course of chemotherapy.** None of the studies reported increases in limb volume as a result of progressive resistance training, but some of the studies were underpowered with regard to this outcome or lacked appropriate control.

The current report is distinguished from previous work not only by its larger size and longer duration (1 year), but also because its prespecified outcomes included visits for lymphedema exacerbations; there were 195 such visits among the 70 patients in the control group, as compared with 77 among the 71 patients in the weight-lifting group. Although no cost analysis was reported, the **weight-lifting intervention clearly has the potential to result in cost savings, not only by reducing direct health care costs but also by potentially reducing the risk of disability and allowing women to return to work at full capacity, either within or outside the home.** Such an intervention may be particularly worthwhile in disadvantaged populations, in which the burden of lymphedema is greatest (because the stage of disease at diagnosis tends to be more advanced, requiring more aggressive treatment) and the consequences of reduced arm function may be more severe (because of the higher likelihood of manual labor-based employment and fewer economic resources to cover loss of function). The inclusion in the present study of nonwhite women and women with a broad range of occupational and educational levels suggests that the study findings are highly generalizable, supporting future investigation. Moreover, the delivery of the exercise program at YMCAs will facilitate future dissemination.

As promising as this intervention appears, critical follow-up research, including detailed cost analysis and dissemination analyses, is warranted to determine whether the intervention can be disseminated effectively or whether it will instead sit on the shelf. Such research can be difficult, especially since the intervention is behavioral in nature and therefore falls outside the purview of the pharmaceutical industry, being reliant on governmental funding.

The report by Schmitz et al. provides strong reassurance regarding the safety of appropriately supervised weight training in women with a history of breast cancer and lymphedema. A comprehensive strategy to improve the outcomes in these women should include **dietary and exercise interventions aimed at weight management, since overweight, obesity, and weight gain after diagnosis are recognized as significant risk factors for lymphedema as well as for breast-cancer-associated death.** Multifactor interventions that promote healthy eating, regular exercise (e.g., aerobic and progressive resistance training), and other lifestyle improvements (e.g., reducing smoking and alcohol use) have the potential to substantially improve overall health and survival among women with this common cancer.

Dr. Bleyer:

- ☑ As mentioned in the last paragraph, the combination of exercise and nutrition (**E&N**) is even more likely to prevent lymphedema and reduce symptoms in breast cancer patients with this condition, as well as, and far more important, recurrence of, and death due to, breast cancer.
- ☑ As exemplified in the first report this month, on colorectal cancer, it is scientifically reasonable to expect that the benefit of **E&N** observed in patients with one type of cancer is likely to apply to patient with other, if not most, cancers
- ☑ The main reason that the benefit has (yet) not been reported in most cancers is that randomized clinical trials—the most convincing evidence of benefit or lack thereof occurs with type of study—have not been yet performed in the less frequent cancer in which such trials take longer and are otherwise more problematic
- ☑ Prudent clinician-scientists and their patients would predict that future clinical trials would support the hypothesis that the **E&N** benefit is generalizable, and not just for cancer

▶ **Nutrition**

Eating less to live more [Cancer Prevention, Laboratory Study]

[A 20-year, controlled, calorie-restricted trial in 76 rhesus monkeys documents the benefit of diet and weight control in preventing cancer, as well as other diseases, and in preventing brain loss](#)

By Suzanne Dixon, MPH, MS, RD
Healthnotes Newswire, August 13, 2009

Caloric restriction is the practice of limiting calorie intake without causing malnutrition, with the goal of improving health and slowing the aging process. It is the only health intervention consistently shown to improve length of life in all species studied—until recently, however, primates, including humans, were rarely studied. Recently released results of a 20-year, controlled, calorie-restricted trial in 76 rhesus monkeys have filled in that knowledge gap. Monkey meals

A typical calorie-restricted diet reduces intake by about 30% of what is calculated to maintain a healthy body weight for an individual. For example, if a healthy, moderately active adult requires 2,200 calories to maintain his or her weight, a calorie-restricted diet would have this person eating about 1,540 calories per day.

For this research, the monkeys were randomly selected for the normal diet group (control) or the calorie-restricted group. In the restricted group, each monkey's diet was individually designed to reduce calories by 30%, based on baseline food intake, body weight, and age.

After 20 years, the study yielded the following results:

- 37% of the control monkeys and 13% of the calorie-restricted monkeys died of age-related causes, including diabetes, cancer, and cardiovascular disease.
- Body weight in the calorie-restricted group was reduced and weight loss predominantly was due to loss of fat mass.
- The calorie-restricted monkeys experienced less age-related loss of muscle mass.
- 42% of the control group animals developed prediabetes or diabetes, while none of the calorie-restricted monkeys developed these conditions.
- **The occurrence of cancer and cardiovascular disease were reduced by 50% each** in the calorie-restricted group compared with the control group.
- The calorie-restricted monkeys **lost less gray matter**, a type of tissue in the brain, compared with the control group.

No picnic

The key to healthy calorie-restricted is that the diet focus on nutrient-rich foods such as vegetables, fruit, whole grains, and legumes (beans and peas). With about 1,500 calories per day, there isn't much room for potato chips and cake! This type of diet is very hard to follow consistently. Furthermore, people who do follow a well-balanced calorie-restricted diet note that they are hungry...all the time.

Reality check

The take-home message is that it isn't realistic or practical for everyone to follow a calorie-restricted diet. Especially because of the high risk of malnutrition if this type of diet isn't carefully planned and implemented. It's tough to get all of the nutrients needed for good health in such a small number of calories. Note that calorie restriction is never an option for children, as it can stunt growth.

So, what is practical? Very few among us could pull off a calorie-restricted diet for any length of time, but **it is within our means to eat more fruits, vegetables, and whole grains; reduce intake of sugars and fats; exercise**

regularly; and maintain a healthy body weight. Regardless of whether calorie restriction can prolong human life and enhance health, we do know that obesity, poor diet, and lack of exercise shorten life and lead to chronic disease, poor health, and suffering.

Source: Science 2009;325:201–4

Dr. Bleyer:

- ☑ This report of an study in monkeys that included cancer prevention is included for several reasons:
 - ☑ It took 20 years to complete, which in monkeys is equivalent to a lifetime in humans, and thereby represents the first study of a lifetime of lifestyle in subhuman primates, and should have thereby the most relevance of all studies conducted to date in non-humans
 - ☑ It was published in Science, one of the, if not *the*, most respected peer-reviewed journal in all scientific fields
 - ☑ It was written by Suzanne Dixon, MPH, MS, RD, who will return for a third annual presentation to **DEFEATcancer** in October
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