

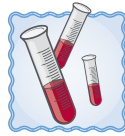


# Harvard Men's Health Watch

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## PSA: Prostate-Specific Antigen, Persisting Scientific Ambiguities

The prostate-specific antigen (PSA) test is the most important issue in men's health. It is also the most controversial. When the results of two much-anticipated studies were released this spring, they went a long way toward focusing the debate—but scientists are still a long way from concluding the discussion.



Few could have anticipated the PSA controversy in 1966, when the protein was first identified in semen. It rapidly became a favored tool for law enforcement agencies, which used it as a marker for the presence of semen in cases of suspected sexual assault. The next important landmark in the history of PSA came in 1979, when doctors identified PSA in blood. Blood PSA levels were first used to screen for prostate cancer in 1987, and FDA approval for PSA as a screening test followed seven years later.

PSA testing caught on rapidly in the U.S. By now, most men above age 50 have been tested, and many are tested repeatedly. That's no surprise, since our society has been encouraged to value the early diagnosis of cancer along with the prompt and often aggressive treatments that follow. More surprising, perhaps, is that many experts believe

that prostate cancer is the exception to the rule, and that PSA screening may actually do more harm than good. That's the crux of the controversy, and it's the very question that the two major new studies were designed to answer. But to understand how this research alters the debate, it's important to understand the controversy itself. And that means starting at the beginning.

### What is PSA?

At the center of the dispute is a simple *glycoprotein* (sugar-containing protein) produced by the *epithelial cells* of every prostate gland, benign or malignant. The prostate secretes PSA in the ejaculate, where its job is to liquefy semen, allowing sperm to swim toward their target. But although PSA is intended for the semen, some of it spills into the blood, where it can be measured by a simple blood test. Blood tests can also measure how much of the PSA is bound to other proteins and how much is unbound, or free.

### One test, several roles

Doctors use blood PSA levels for several very different purposes. The test is an extremely important way to diagnose prostate cancer in men who have symptoms or laboratory abnormalities that raise suspicion of the disease. PSA levels are also used to evaluate the results of prostate cancer treatment. Some doctors even use PSA readings to estimate the severity of *benign prostatic hyperplasia* (BPH), non-malignant enlargement of the gland. There is no controversy about these PSA tests—but there is controversy galore about the most widespread use of PSA testing: screening for prostate cancer in men who are free of signs and symptoms of the disease. ▶▶

### Prostate specific?

For all the uncertainties about the PSA, at least we can be sure the name is accurate.

Wrong. The protein that bears the name "prostate-specific" has also been detected in other organs, including the liver, pancreas, salivary gland, and breast (even in females). Only tiny amounts of PSA are present in these tissues. Still, purists might prefer the name Prostate Almost-Specific Antigen, while wags might suggest Perplexing Semantic Anomaly.

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## PSA (continued)

### Screening for early disease

The purpose of any screening test is to detect disease before it becomes clinically evident. Routine measurements of blood pressure and cholesterol are examples of screening tests that have proved their worth. In the realm of cancer screening, Pap tests for cancer of the cervix, mammograms for breast cancer, and various tests for colon cancer have gained widespread acceptance.

A screening test is successful if it meets several goals:

1. It has a high *sensitivity*; that is, it detects a high percentage of cases while missing few
2. It has a high *specificity*; that is, it doesn't falsely diagnose disease when none is present
3. The test is reliable and reproducible and also safe, convenient, and inexpensive enough to gain widespread acceptance
4. Above all, the test must lead to a treatment that will improve the patient's quality of life, extend the duration of his life, or both. In a word, the test should do more good than harm.

Laboratory testing methods have improved so that PSA testing is now reliable and reproducible. Requiring only a single blood sample, the test itself is safe, convenient, and inexpensive. Coupled with the general belief that early detection is a no-brainer, these factors explain why PSA screening has become so popular. But this good news about PSA screening doesn't address the test's sensitivity and specificity, which are low (see below). And the low cost and safety of the blood test don't extend to the next steps. PSA screening often leads to prostate biopsies that are frightening, uncomfortable, and expensive. And screening may lead to treatments that do more harm than good. That's because of the limitations of the PSA itself and the very unusual natural history of prostate cancer.

### Limitations of the PSA

For a test to be useful, doctors should be able to tell you whether your result is

normal. Most tests have a well-established range of normal values, but for the PSA, even this apparently simple issue is controversial. Most doctors in the United States use 4.0 nanograms per milliliter (ng/mL) as a cutoff, considering results below that as normal and higher values as abnormal. But since PSA values tend to rise with age, even in healthy men, other authorities have proposed a range of normal values adjusted for age (see Table 1).

Unfortunately, however, there is no clear-cut threshold for "normal" at any age. The likelihood that a man has prostate cancer increases as PSA levels rise, but even men with low PSAs face some risk. An important study shows how the risk rises as the PSA increases, even within the normal range (see Table 2, page 3). At higher PSA levels, the risk is even greater; according to some estimates, it may exceed 50% at PSAs above 10.

Even if there is no true "normal" range for the PSA, each man might have his own normal. If that were the case, then an increase in PSA might be cause for concern. Serial PSA testing measures the so-called *PSA velocity*, which does have value, particularly in predicting the prognosis of men who have been diagnosed with prostate cancer (see box, page 3). But many things other than cancer can produce changes in the PSA; Table 3 on page 4 lists some of these factors.

The real question is not whether a PSA result is normal but what it means. And when it comes to interpreting results, the PSA's strengths and weaknesses become clear. The test's strength is its ability to detect prostate cancer in its earliest, most potentially curable form. In round

**Table 1: A proposed age-adjusted PSA reference range**

Age group	Proposed normal PSA range
40-49	0-2.5 ng/mL
50-59	0-3.5 ng/mL
60-69	0-4.5 ng/mL
70-79	0-6.5 ng/mL

numbers, PSA testing has the potential to detect about 80% of prostate cancers. Still, a normal or low reading does not rule out the disease; about 20% of men with prostate cancer have normal PSA results. A false-negative result provides false reassurance, but it's less of a problem than a false positive, which often causes great anxiety and usually leads to a prostate biopsy. In all, about 70% of men with high PSA results do *not* have cancer. And the biggest worry of all is overdiagnosis, finding prostate cancers that are so slow-growing that the treatment is worse than the disease.

### The natural history of prostate cancer

Prostate cancer is extremely common. According to current estimates, about 17% of American men will be diagnosed with prostate cancer during the course of their lifetimes. That means each of us has a one-in-six chance of being diagnosed with the disease. That sounds scary, and it does underline the importance of prostate cancer. Remember, though, that the typical American man has just a 3% chance of dying from prostate cancer. In other words, only about one of every six clinically diagnosed prostate cancers will be lethal. Remember, too, that many prostate cancers never even become large enough or troublesome enough to be diagnosed clinically; Table 4 (on page 5) is based largely on autopsy studies from the pre-PSA era and shows that small, clinically silent prostate cancers are much more common than clinically diagnosed disease. All in all, men are substantially more likely to die *with* prostate cancer than *from* prostate cancer.

The PSA can never tell the many slow-growing, indolent, harmless prostate cancers from the less common, aggressive, potentially lethal cancers. In fact, the PSA cannot even diagnose cancer. Instead, it triggers a prostate biopsy. If doctors see cancer cells in the tissue sample, they try to estimate the cancer's aggressiveness based on

### Variations on a theme

Even before the new PLCO and ERSPC results were unveiled this spring, researchers were aware of limitations of PSA screening. Several modifications have been proposed, but none has proved superior to the PSA itself. One approach relies on measurements of both the total PSA and the free PSA. Cancer is more likely when the free PSA constitutes less than 25% of the total PSA; the lower the percentage of free PSA, the more likely the diagnosis of cancer. Another refinement depends on serial measurements of the PSA, typically at yearly intervals. The *PSA velocity* reflects the rate of change; researchers suggest that a rise of more than 0.75 ng/mL over the course of a year increases the likelihood of cancer. A similar modification, the *PSA doubling time*, helps doctors establish the prognosis for patients with prostate cancer; the shorter the doubling time, the worse the outlook.

its appearance. This so-called Gleason scoring system (see *Harvard Men's Health Watch*, June 2008) is imperfect, but it's the best we've got.

What does this have to do with PSA screening? Tests that lead to early diagnosis of aggressive prostate cancers might enable lifesaving treatment. That's the major plus for screening, and it's the upside of the PSA. But when screening identifies cancers that would never cause symptoms or harm during the patient's lifetime, it's called overdiagnosis.

Overdiagnosis is the major downside of PSA screening. A diagnosis of prostate cancer usually leads to treatment, and all prostate cancer treatments carry a substantial risk of side effects that may include sexual and urinary dysfunction. As a result, diagnosing aggressive cancers can be lifesaving, but diagnosing harmless cancers does more harm than good. The lower the PSA threshold for prostate biopsies and the more cores of tissue taken with each biopsy, the greater the risk of overdiagnosis.

### The great debate

Hundreds upon hundreds of scientific papers have been written about the pros and cons of PSA screening, and debate in the public arena has often seemed even more intense than in the medical community. Until now, medical experts have divided into two broad camps, which we might call the PSA advocates and the PSA agnostics. Here's the gist of their positions.

### The case for PSA screening

The American Cancer Society (ACS) recommends that doctors discuss annual PSA testing with every man above the age of 50 who has a life expectancy of 10 years or longer; it also calls for yearly discussions to start at the age of 45 for men at increased risk, including African Americans and men with family histories of prostate cancer. The ACS says that if a man cannot decide, his doctor should recommend testing. The American Urological Association also recommends PSA screening. Until 2009, they had the same guidelines as the ACS, but their new guidelines call for doctors to offer the test to all men with a life expectancy of at least 10 years, beginning at age 40.

They have a point. Requiring only a single blood sample, PSA testing is quick, easy, and safe. With a typical cost of about \$40, it is inexpensive, and technical improvements have made it reliable in most labs. ▶▶

**Table 2: Prostate cancer risk at low PSA levels**

PSA (ng/mL)	Prevalence of prostate cancer
0.5 or less	6.6%
0.6–1.0	10.1%
1.1–2.0	17%
2.1–3.0	23.9%
3.1–4.0	26.9%

Source: Thompson, et al. *New England Journal of Medicine*, 2004, Vol. 350, pp. 2239–2246.

Advocates of PSA screening point out that the test has the potential to detect about 80% of prostate cancers. Without screening, some 40% of prostate cancers are not diagnosed until they have spread too far to be curable. Early detection is surely the best hope for curing prostate cancer, and PSA screening is the best way to find early disease.

### The case against PSA screening

The Canadian Task Force on Preventive Health Care and the Canadian Urological Association recommend against PSA testing in men who seem healthy. The U.S. Preventive Services Task Force recommends against testing for men age 75 or older as well as for men with life expectancies of 10 years or less. For other men, the task force notes that the “potential harms of screening for prostate cancer can be established, [but] the presence or magnitude of potential benefits cannot.” The American College of Physicians and American Academy of Family Physicians agree that men should be counseled about “the known risks and uncertain benefits of screening for

prostate cancer” before they undergo any testing.

They, too, have a point. Even at an average cost of \$40, the annual testing of all American men over 50 would cost billions of dollars. Still, it might save money if early diagnosis could reduce the need for even more expensive treatment of advanced cancer. But critics go beyond economics to consider the problem of overdiagnosis. The PSAgnostics have long argued that screening might produce more harm than good if it leads to unnecessary treatment in men who would never be harmed by their prostate cancers.

For all their differences, the PSAadvocates and PSAgnostics have agreed on one point: the only way to resolve the issue is with high-quality randomized clinical trials. And that’s just why the two new studies are so important.

### The American study

The Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial began studying PSA screening in 1993. Over the next eight years, 76,693

men between the ages of 55 and 74 volunteered for the study, which was conducted at 10 medical centers around the United States. Scientists randomly assigned half the men to receive annual PSA testing for six years along with annual digital rectal exams (DREs) for four years; men who had PSA levels above 4.0 ng/mL or abnormal DREs were advised to seek diagnostic evaluation, which usually involved a prostate biopsy. Men in the comparison group continued to receive their usual medical care. Men in either group who were diagnosed with prostate cancer were treated by their personal physicians; PLCO researchers monitored the treatment methods and found they were similar in the two groups.

The PLCO scientists tracked the men to find out how many were diagnosed with prostate cancer and how many died from the disease. After seven years of observation, 22% more cases of prostate cancer were detected in the men who had regular PSA screening. However, even though PSA screening increased the diagnosis of prostate cancer, it did not improve survival. There were 50 deaths in the PSA-screened group and 44 in the comparison group; the 13% higher death rate in the PSA group was not statistically significant. About two-thirds of the men have completed another three years of follow-up in this ongoing study; the results at 10 years mirror the findings at seven years.

The PLCO study is slated to continue until all the volunteers have been evaluated for 13 years. Researchers are compiling information on treatment side effects and quality of life along with additional mortality data.

### The European study

Like the American study, the European Randomized Study of Screening for Prostate Cancer (ERSPC) began in the early 1990s. A total of 162,243 men between the ages of 55 and 69 volunteered for the study. Scientists randomly assigned half the men to receive

**Table 3: PSA variability**

Many things besides prostate cancer can affect a man’s PSA reading. Here are some of the common ones.

#### Factors that typically produce a substantial and/or sustained rise in the PSA

- Benign prostate hyperplasia (BPH)
- Prostatitis (inflammation of the gland)
- Urinary tract infections
- Prostate biopsies or surgery

#### Factors that sometimes produce a small and/or temporary rise in the PSA

- Ejaculation
- A doctor’s digital rectal exam
- Foley (bladder) catheter and cystoscopy (bladder examination)
- Vigorous bike riding
- Warm climates
- Changes in labs or testing methods

- Hepatitis
- Bypass surgery
- Random (unexplained) variation

#### Factors that typically produce a substantial and/or sustained decrease in the PSA

- Therapy with *finasteride* (Proscar, generic) or *dutasteride* (Avodart)

#### Factors that sometimes produce a small and/or temporary decrease in the PSA

- Therapy with a statin drug
- Therapy with a nonsteroidal anti-inflammatory drug
- Obesity
- Changes in labs or testing methods
- Random (unexplained) variation

PSA screening and the other half to receive their usual medical care. Because the study was conducted in multiple medical centers spread across seven countries, the investigators followed a number of slightly different research protocols. In most cases, PSA screening was performed an average of once every four years and, in most study centers, readings of 3.0 ng/mL triggered prostate biopsies. Men who were diagnosed with prostate cancer were treated by their own physicians according to local guidelines.

After about nine years of observation, 214 men in the PSA screening group had died from prostate cancer, while 326 men in the comparison group had died from the disease. That means screening reduced the risk of dying from prostate cancer by 20%, a result that was just at the margin of statistical significance. But the reduced mortality came at a price: an additional 48 men who were not destined to die from prostate cancer had to be treated to prevent one death from the disease.

The ERSPC scientists will continue to monitor the volunteers, evaluating both deaths from prostate cancer and side effects of treatment and quality of life.

### Imperfect but important

Both the PLCO and ERSPC trials are large, high-quality randomized clinical trials, but like all such research, they have potential shortcomings. Neither study provides information beyond 10 years, but both are ongoing, which is important because many prostate cancers grow very slowly. The PLCO study has the advantage of following a single uniform nationwide protocol, but only 85% of the men assigned to screening underwent the recommended testing, and 52% of the men in the comparison group chose to have PSA tests on their own. Still, the differences in screening rates are large enough that if testing produced a benefit, it should show up in a study this big. Some experts are likely to assert that the PSA cutoff

of 4.0 ng/mL was too high (see Tables 1 and 2), but it is the level in general use in the United States. The ERSPC study generally used a PSA cutoff of 3.0 ng/mL, but has the disadvantage of incorporating slightly different standards and research protocols in each of the seven participating countries.

The American study found that PSA screening did not prevent death from prostate cancer during the first decade of screening. The European investigators reported a small mortality benefit, but at substantial cost of overdiagnosis and overtreatment. They found that a man whose prostate cancer was diagnosed by screening would have a one-in-49 chance of gaining a lifesaving benefit from prostate cancer treatment. Looked at another way, since an average American man's risk of dying from prostate cancer is 3%, the 20% reduction in relative risk reported by ERSPC would translate to an absolute risk of 2.4%, or a 0.6% reduction in a typical man's personal risk of dying from prostate cancer.

Experts have already begun debating the merits and significance of PLCO and ERSPC. Limitations in the studies ensure that a healthy discussion will continue, and we are all looking forward to results from additional research, such as PIVOT (Prostate Cancer Intervention Versus Observation Trial) in the U.S. and the PROTECT (Prostate Testing for Cancer and Treatment) study in Britain. But in science, as in politics, the perfect should not become the enemy of the good. PSA advocates and PSAgnostics have long called for large, high-quality randomized clinical trials of PSA screening, and now they have two. Attention must be paid.

### Should you have a PSA test?

Medical researchers and policymakers need to know if mass screening programs prevent death. In the case of PSA screening, the best available evidence is that testing produces little or no reduction in prostate cancer mortality.

**Table 4: Overall risk of developing prostate cancer**

Age group	Risk of prostate cancer
50–59	10%–42%
60–69	17%–38%
70–79	25%–66%
80 and over	Up to 90%

Modified from *Report of the U.S. Preventive Services Task Force: Guide to Clinical Preventive Services*, 2nd ed. Williams and Wilkins, 1996, p. 121.

And although the PLCO and ERSPC studies have not yet released data on the side effects of treatment, it is likely that since screening does not substantially reduce the risk of death, the side effects of overdiagnosis and overtreatment will mean that screening does more harm than good.

Public policy is one thing, personal preference quite another. We have long maintained in these pages that while there is no right answer about PSA screening, there are two wrong answers: you must be tested, and you should never be tested. As before, each man should consult with his physician (and often his spouse), then decide for himself. And the decision can change from year to year as new information comes in.

Despite these major new studies, PSA testing remains a personal decision. But things *have* changed. Before PLCO and ERSPC, the PSAgnostics said there was no evidence that PSA screening saves lives. Now, they can say there is good evidence that screening does not save lives. Before PLCO and ERSPC, the PSA advocates said that if a man could not decide whether or not to have a PSA, the default recommendation was in favor of testing. Now they may come to say that unless a man has a particular reason to request a test, the default recommendation might be against screening.

The contest will continue, but the playing field has tilted. ▶▶

## Looking ahead

Prostate cancer is the most common internal malignancy in American men; about 186,000 cases will be diagnosed this year alone. And in the course of this year, about 29,000 men will die from prostate cancer, making the disease the second most common cause of cancer deaths in American men. And whatever doctors think about PSA screening, they all agree that

29,000 deaths are far too many.

Enormous amounts of brainpower, effort, time, and money have been devoted to research on PSA screening. And even after PLCO and ERSPC, more study is needed. Still, the new studies suggest it may be time to re-direct some energy and effort to other crucial issues, starting with ways to prevent the disease. We also have a desperate need for good markers to tell if

a man is at risk for aggressive prostate cancer, for better ways to distinguish harmless cancers from potential killers, and for research to find treatments that can cure aggressive tumors. The PLCO and ERSPC studies have not resolved all the questions about PSA screening, but they have opened a new chapter in research on the often harmless, sometimes lethal, always perplexing disease we call prostate cancer. ♥

## Nutrition 101: Good eating for good health

**T**urn on your TV, open a newspaper, or boot up your computer and you're bound to get some confusing news about diet and health. Don't let it drive you to distraction—or to the donut shop. Instead, remember four key facts:

- What you eat affects your appearance, your energy and comfort, and—above all—your health.
- America is on the wrong track. Two out of every three of us are overweight or obese. Diabetes and high blood pressure are on the rise. Heart attacks, strokes, and cancer are distressingly common. Many factors contribute to these complex problems, but the basic reasons are simple: we eat too much, we choose the wrong foods, and we don't get enough exercise.
- Scientists know what diet is best for health. The fine print has changed and is likely to change some more, but the key facts are in.
- Good eating is not a punishment, but an opportunity. If you know why it's important and what to do, you'll find it enjoyable and satisfying. And if you establish an overall pattern of healthful nutrition, you'll have plenty of wiggle room to savor the treats that matter most to you.

### Your goals

For most people, TLC stands for tender loving care. For doctors, it stands

for the Therapeutic Lifestyle Changes diet. Either way, the TLC diet provides sound goals for most Americans (see box, page 7).

### The best diet

People don't eat nutrients, they eat food. Here are 20 guidelines for healthful and enjoyable eating.

1. Eat a variety of foods; since no single food is perfect, you need a balanced mix of foods to get all the nutrients your body requires.
2. Eat more vegetable products and fewer animal products.
3. Eat more fresh and homemade foods and fewer processed foods. Avoid fast food and junk food. You know what they are.
4. Choose your fats wisely. Cut down on meat, the skin of poultry, whole-fat dairy products, stick margarine, fried foods, processed snack foods, and commercial baked goods made with trans fat. Think about dressings, sauces, and cooking oil. Use olive or canola oil to cook whenever possible, and moisten your bread with olive oil or soft margarine. Get "good fats" from fish and nuts.
5. Choose your carbs wisely. Cut down on simple sugars; remember that sodas, sports energy drinks, and fruit juices are loaded with sugar. Cut down on highly refined products made



with white flour. Favor whole-grain, coarsely ground, unrefined products. Don't be fooled by dark-colored bread or by labels that boast of unbleached flour, wheat grain, or multigrain flour. Instead, look for whole grain as the first ingredient, and read the fine print to learn the fiber content of a portion; more is better. Learn to like bran cereal, vegetables, fruits, nuts, and seeds. Consider fiber supplements if you can't get enough from whole foods.

6. Consume at least three cups of non- or low-fat dairy products a day.
7. Eat protein in moderation. Favor fish and skinless poultry. Experiment with soy and beans as a protein source. Aim for 5½ ounces of protein-rich foods a day; count ¼ cup of cooked beans or tofu, ½ ounce of nuts or seeds, or one egg as equivalent to 1 ounce of cooked fish or cooked lean meat or poultry.
8. Restrict your sodium intake to less than 2,300 mg per day, particularly if your blood pressure is borderline or high, by reducing your use of table salt and processed foods such as canned

soup and juices, luncheon meats, condiments, frozen dinners, cheese, tomato sauce, and snack foods. Men with blood pressure above 120/80 mm Hg should aim for 1,500 mg a day, as should men above age 50.

**9.** Eat more potassium-rich foods, such as citrus fruits, bananas, and other fruits and vegetables. Eat more calcium-rich foods such as low-fat dairy products, broccoli, spinach, and tofu (but don't take calcium supplements to boost your daily intake above 1,200 mg).

**10.** Eat more grain products, especially whole-grain products, aiming for at least 6 ounces a day. Count one cup of dry cereal; ½ cup of cooked cereal, rice, or pasta; or one slice of bread as 1 ounce. Whole grains and brown rice should provide at least half your grains; the more the better.

**11.** Eat more vegetables, especially deep-green and yellow-orange vegetables. Aim for at least five servings a day. Count one cup of raw leafy greens, ½ cup of cooked or raw vegetables, or ½ cup of vegetable juice as one portion.

**12.** Eat more fruits, aiming for at least four servings a day. Count one medium-size piece of fruit; ½ cup of fresh, frozen, or canned fruit; or ½ cup of fruit juice as one portion.

**13.** Eat more fish, aiming for at least two 4-ounce servings each week. Remember to broil, bake, or grill instead of frying.

**14.** If you choose to eat red meat, try to reduce your intake to two 4-ounce servings per week. Avoid “prime” and other fatty meats, processed meats, and liver. Switch to chicken and turkey, always removing the skin. Be sure your meat and poultry are cooked to 160° or more, but not charred.

**15.** Eat eggs sparingly; aim for an average of no more than one egg yolk per day, including those used in cooking and baking. Use egg substitutes whenever possible.

**16.** Include seeds and unsalted nuts in your diet. Nuts have been linked to a reduced risk of cardiac death, but since they are high in calories, moderation is the watchword.

**17.** Use vegetable oils in moderation, favoring olive and canola oils. Reduce your intake of partially hydrogenated vegetable oils, palm oil, and coconut milk.

**18.** If you choose to use alcohol, drink sparingly. Men should not average more than two drinks per day, women one a day. Count 5 ounces of wine, 12 ounces of beer, or 1½ ounces of liquor as one drink. Never drive or operate machinery after drinking.

**19.** Adjust your caloric intake and exercise level to maintain a desirable body weight. If you need to reduce, aim for gradual weight loss by lowering your caloric intake and increasing your exercise level.

**20.** Avoid fad diets and extreme or unconventional nutritional schemes. If it's too good to be true, it's not true. And remember that these guidelines are intended for healthy people; people with medical problems should consult their doctors to develop individualized nutritional plans.

## Making changes

To create a healthful diet, learn to think about food in a new way. Most of us were raised in an era when meat and potatoes were the American ideal. Now we know that vegetables, fruits, whole grains, nuts, and fish are best. It seems like a radical change, but it's actually a return to the basic principles that served our ancestors well and that survive today as the traditional Mediterranean diet (see *Harvard Men's Health Watch*, February 2008).

To enjoy a healthful diet, experiment with new recipes and meal plans. Be creative and take chances. Instead of dreading your new diet, have fun with it.

To achieve a healthful diet, change slowly. By the time you are 40, you'll have eaten some 40,000 meals—and lots of snacks besides. Give yourself time to change, targeting one item a week. Start with breakfast, switching from eggs, bacon, donuts, white toast, or bagels to oatmeal or bran cereal and fruit. If you just can't spare 10 minutes for a sit-down breakfast, grab high-fiber cereal bars instead of donuts or muffins. Don't worry about cutting out coffee or tea unless they make you feel jumpy. Next, try out salads, low-fat yogurt or low-fat cottage cheese,

## The TLC diet

Total calories	Adjusted in conjunction with exercise to attain or maintain healthy body weight
Total fat	25%–35% of total calories
Saturated fat	Less than 7% of total calories
Polyunsaturated fat	Up to 10% of total calories
Monounsaturated fat	Up to 20% of total calories
Cholesterol	Less than 200 mg a day
Carbohydrates	50%–60% of total calories
Protein	About 15% of total calories
Fiber	The Institute of Medicine now recommends 38 grams a day for men before age 50 and 30 grams a day thereafter.

tuna or peanut butter sandwiches, and fruit for lunch. Snack on unsalted nuts, trail mix, fruit, raw veggies, Rye Krisp, or graham crackers. Try eating a few handfuls of a crunchy fiber cereal such as Kashi, or nibble on a cereal bar. Finally, work on dinner, experimenting with fish, skinless poultry, beans, brown rice, whole-wheat pasta, and, of course, salads and veggies. Fruit and low-fat frozen desserts are examples of desirable after-dinner treats. And there's nothing wrong with cake, pie, or chocolates as long as the portions are moderate.

To survive a healthful diet, be relaxed about it. You will never find a perfect food. Not everything on your plate needs to have a higher purpose.

Take your tastes and preferences into account. If roast beef is your favorite food, it is okay to eat it—but try to make it a Sunday treat instead of a daily staple. The choices are yours—and the better your overall diet, the more “wiggle room” you'll have to indulge your passions.

To eat for health, take a long-range view. Don't get down on yourself if you slip up or “cheat” from time to time. Don't worry about every meal, much less every mouthful. Your nutritional peaks and valleys will balance out if your overall dietary pattern is sound.

### Healthful eating, healthful living

A good diet is one of the two keys to prevention. The other is exercise. And

moderation and balance are the keys to making both work for you. You can get started simply by walking for 30 minutes a day; it sounds like a lot, but you can do it in 8- to 12-minute chunks throughout the course of your day. And remember to climb the stairs and do yard work and household chores the old-fashioned way whenever you can.

In 21st-century America, many of us need a new way to think about diet and exercise. In truth, though, it's not so new after all. Some 2,400 years ago, Hippocrates, the father of medicine, wrote, “If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health.” ♥



## ON CALL

### Cell phones and hospitals

**Q** When I visited a friend in the hospital recently, I was annoyed that I was not allowed to use my cell phone. Are cell phones really dangerous?

**A** Ever since they became popular, cell phones have provoked controversy. Because they emit radio-frequency fields, they've been blamed for everything from cancer to pacemaker malfunction. But the facts are reassuring.

Cancer is not a realistic worry. A recent study evaluated 420,095 Danish people who had been using cell phones for up to 21 years. Confirming earlier studies, the scientists found no link between cell phone use and cancer, including tumors of the acoustic nerve in the ear, the salivary glands, the eyes, or the brain.

Cell phones can interfere with pacemakers—but only if the user holds the phone directly over the pacemaker rather than over the ear (preferably on the side away from the pacemaker). Hospitals ban cell phones in intensive care units because they might interfere with sensitive

electronic monitoring devices. It's a sensible precaution, and it should be respected, but it's rather conservative since cell phones will disturb less than 4% of devices at distances of less than 40 inches. Still, there are other good reasons to restrict cell phone use in patient-care areas. Ringing phones and the conversations that follow can be noisy and disruptive, and camera phones could compromise patient privacy and confidentiality.

Speaking of distractions, the major health threats posed by cell phones are car crashes and other accidents. On the plus side, they are a great boon to communication in medical emergencies.

Like many modern conveniences—and, for that matter, like medications—cell phones are safe, but should only be used as directed.

HBS

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*Because of the volume of correspondence we receive, we can't answer every letter or message, nor can we provide personal medical advice.*



Another choice for page 6.