**17. Annual Exam**

Mr. W came to the office for his annual exam. He was a healthy 72 year old man with high blood pressure and some mild aches and pains. He had recently retired as an engineer, but remained active, although was not an avid exerciser. He took two medicines for his blood pressure, and saw me one other time a year to have it checked. He also took a few supplements, which varied from month to month based on which pills his wife put in his hands every morning. He never had chest pains or shortness of breath, he woke up once a night to urinate and had some increased frequency, but it was nothing that disturbed him. And his weight had been stable. He had been receiving colonoscopies regularly, and on one occasion had a few polyps removed. He had a normal scope three years ago, but his GI doctor suggested he come back for another one in five years. He did check PSA’s with his Urologist, and did see a Cardiologist as well, although I could not ascertain why. In fact every few years he had a stress test, echocardiogram, and carotid ultrasound by that doctor.

Today he wanted “the works,” just to make sure he was healthy. Of course he expected blood work, and he had come in fasting. He thought it may be a good idea to check an EKG, since we had not done one in a while. And he wanted to give me a urine specimen. Also he knew it was time to do a thorough exam, not the cursory looking over that I typically gave him.

“Check everything out,” he said. “Even the finger up the rear end. And my wife says make sure to listen to my neck, so I don’t get a stroke.”

I asked him what he wanted to look for in the blood. “Diabetes, cholesterol, everything,” he said. “And my wife says to check my thyroid too, because I can’t lose weight. And all the vitamin levels.”

In the past he had tests for cholesterol that were not remarkably elevated and, after discussion of treatment risks and benefits, he decided not to take statins. He had no symptoms suggestive of thyroid disease or diabetes, and no change in his urine that might cause alarms. I talked to him briefly about the risks and benefit of some of the exams and tests he requested, but he did not seem deterred by my reservations, especially my concern about the potential high risk of false positive results.

“If you find something, then we can decide what to do about it,” he said. “But there’s no harm in looking.”

I took my questioning a step further, just to see how aggressive he wanted me to be. “If I hear a noise in your neck it could indicate you have a blockage of your carotid artery, although the exam is so inaccurate that chances are it is not blocked. And even if you have a blockage that does not mean you’re necessarily more prone to a stroke. But it does mean I have to do more testing to figure it out.”

“I’m ok with more tests.”

“Let’s say we find a70% blockage. Do we fix it, even though we’re not sure leaving it alone will cause you to have a stroke, and even though surgery to fix it can itself cause a stroke?”

“I don’t want that. We can keep an eye on it. It will make me feel better knowing what’s going on. Maybe that will give me the push I need to lose weight and do some walking. But you know, I don’t want surgery unless I’m at the edge of death. I just want all the information.”

With that in mind, I examined Mr. W, and we sent him for a few less tests than he originally had requested, but tests that both he and I felt would be safe and would give him the information he craved.

**A. Key Questions**

* Does my patient need an annual physical? What will be covered there that is not typically discussed during other visits?
* Does my patient want an annual physical? If so, what is he/she looking to achieve?
* Which physical exam components are potentially effective in my patient that may reveal problems and improve health outcome? Are there harms?
* Which labs tests and studies are potentially helpful for my patient? What is the likelihood of false positive and negative tests, and how effective are these tests in finding fixable problems that improve clinical outcome?

**B. Risks and Benefits**

* **There is no evidence that an annual exam impacts outcome. A recent study showed a statistically insignificant drop in total mortality of 6/1000, but an increase in cardiac mortality of 7/1000 in people getting annual exams over a decade. There were 200/1,000 more diagnoses charted for those people who had the exam compared to those who did not (Fig. 17.1).**
* **Annual blood work has a low diagnostic value, adding information in 7-30/1,000 tests based on which test is ordered. The false positive rate is as high as 360/1,000 (Fig. 17.2).** Therefore approximately 10 out of 1000 lab tests will demonstrate something clinically important, while 360 out of 1000 labs tests will be falsely abnormal and not be of any clinical value. Many of the latter can lead to unnecessary testing and treatment that themselves can cause harm and false disease labeling.
* Annual urine tests have no proven benefit in reducing death from bladder cancer, but have a false positive rate of 900/1,000, and lead to a large number of unnecessary tests.
* **Rectal exams have a false positive rate of approximately 700/1,000 for both prostate cancer and rectal cancer. In addition there is a high false negative rate: 250/1,000 people with prostate cancer had a normal prostate exam. There is no meaningful change in mortality in those who get rectal exams (Fig. 17.3).** Therefore, the vast majority of abnormal rectal exams do not indicate the presence of disease, often leading to unnecessary testing, while a large number of normal rectal exams occur in people who actually do have significant disease.
* Exams for abdominal aneurysms (AAA) have a 500/1,000 false positive rate, and 500/1,000 people with significant aneurysms had a normal exam. Therefore, an abnormal exam has a fifty percent chance of occurring in a person without disease, often leading to unnecessary testing, while people with significant AAA have a fifty percent chance of having a normal exam, leading to false reassurance. There is no proven change in mortality by performing the exam.
* Exams for carotid bruits have a high false positive and negative rate, and have not been shown to reduce the incidence of stroke or death. Apparently, 5/1,000 people with bruits have clinically meaningful carotid disease, and there is a large number of unnecessary testing due to false positive rate. Also, 500/1,000 people with significant carotid disease do not have detectable bruits, and thus the absence of a bruit does not rule out the presence of significant disease.
* Routine EKG testing has a false positive rate of 400-750/1,000, and that number is highest in older patients. It is a poor predictor of adverse events (1-7/1,000 people with abnormal tests have cardiac events in a year), even in the preoperative setting. The false positive rate can lead to unnecessary and potentially harmful testing, can lead to false disease labeling, and can delay surgery when done as part of a pre-operative exam.
* Skin exams have not been shown to reduce mortality from skin cancer, and have a high false positive rate (72-975/1,000 depending on the type of cancer), leading to many unnecessary biopsies. As many as 200/1,000 older patients who have skin biopsies have adverse effects, and there is little evidence that detecting and removing non-melanoma skin cancers in the elderly impacts mortality or quality of life.
* A VA panel recommended that periodic weights, blood pressure checks, and (when appropriate) pap smears do have value. There may be other value in an annual exam that is more difficult to quantify, such as a discussion between doctor and patient about various health matters, medicines, and screening tests.

**BRCTs**

**Annual Exam**

**The Benefits of an Annual Exam**

****

**Figure 17.1. If 1,000 people sitting in a theater have an annual exam, none, represented by no blackened seats, will have any statistically significant improvement in health outcome or mortality.**

**Accuracy of Annual Blood Tests in Finding Disease**

****

**Figure 17.2. Out of 1,000 screening blood tests performed as part of an annual exam, approximately 360 will show false positive abnormalities, represented by blackened seats, that are not indicative of any disease process. Routine urine testing yields a false positive rate of 900/1,000 tests, which is higher than the number of seats blocked. Approximately 7-30 out of 1,000 routine labs add some clinical information that may be of value.**

**Benefits of a Rectal and Prostate Exam**

****

**Figure 17.3 Of 1,000 people sitting in a theater who have a rectal exam as part of the annual exam and have an abnormality detected either in the prostate or rectum, 700 of them will be false positives, represented by blackened seats, and will often need further testing to prove that they are benign.**

**C. Discussion**

Annual physical exams are a mainstay of modern American medical practice. They constitute a crucial mission of primary care, and they are viewed by the community at large as beneficial and even necessary for the promotion of good health. It has been estimated that 44 million Americans receive an annual exam every year at a cost of $8 billion annually.[[1]](#endnote-1)[[2]](#endnote-2) In fact, annual exams comprise 80/1,000 of all physician visits. Patients want and expect an exam. One study suggested that, like with Mr. W, the exam and subsequent annual testing may decrease patient worry, as well as providing a forum to discuss health issues not related to a patient’s specific medical problems or complaints.[[3]](#endnote-3) Doctors also largely encourage the annual physical. In a 2005 survey, more than half of doctors stated support for preventive exams and tests, even those that had been deemed to be ineffective.[[4]](#endnote-4)

What specifically comprises an annual exam will vary between doctors and patients. The one constant is that the tests ordered, and the physical exam performed, are not driven by specific health concerns or complaints that the patient may express. Symptom-based exams and testing fall into a different category. The annual exam is a forum to look for problems about which the patient may be unaware. It is essentially a preventive visit; if we can find problems before they become severe, it is argued, then we may be able to improve outcome. But by fishing for problems, we may uncover false positives: Abnormal results that are not reflective of real disease. It is felt that for 14 aspects of a typical annual exam, including tests and labs, there is a 500/1,000 chance of finding at least one false positive.[[5]](#endnote-5) Since may lab panels themselves have more than fourteen tests, then a comprehensive annual exam can potentially reveal many false positives, which could lead to over testing and overtreatment. There is also a danger of false negatives, where tests or exams are normal in the face of real disease, a situation that sows a sense of false security.

Several common elements of the annual exam have been studied. These include blood tests, urine tests, the EKG, aspects of the physical exam, and gynecological tests. Many screening tests that are often discussed at an annual exam have been covered in other chapters, including mammograms, stress tests, colonoscopies, cholesterol screening, and smoking cessation. We will focus on other aspects of the annual exam to ascertain what evidence exists for benefit or harm.

A VA panel evaluated various aspects of the physical exam using available evidence. They concluded that certain parts of the exam were medically sensible, such as periodic weights, blood pressure check every two years, and pap smears every 3 years for sexually active women under age 65 who have a cervix. They found no evidence to support exams of the prostate, carotid arteries, abdomen to assess the presence of an aneurysm, lung, pulse, lymph nodes, and the peripheral nerves, all of which have high false positive and false negative rates. There is also no evidence that a routine exam of the heart will yield useful clinical information that would not otherwise be obtained in a patient’s history (most notably the presence of murmurs that may indicate valvular heart disease, a condition typically only treated when symptoms occur), or that checking a pulse for arrhythmias such as atrial fibrillation will yield clinically useful information. The study concluded: “Comprehensive routine physical examinations are not recommended for the asymptomatic adult.”[[6]](#endnote-6) The US Preventive Services Task Force evaluates many parts of the annual exam, but does not comment on the benefits or risks of the exam itself. The most salient barrier that precludes a sensible discussion of the exam and its various parts is the lack of good evidence to demonstrate the ramifications of screening on mortality and morbidity over an extended period of time.[[7]](#endnote-7)

One large meta-analysis recently evaluated the annual exam as a whole. Fourteen studies comprising 180,000 people compared those who had annual exams to those who did not over a ten year period. Most annual visits included vital signs, a comprehensive physical exam, EKG, and multiple lab tests including cholesterol. Overall, those in the annual exam arm had an increase in the number of diagnoses made by 200/1,000 compared to those who did not have a yearly visit. However, over 9-10 years, there was no statistically significant difference in mortality, cardiac mortality, cancer mortality, hospitalization, morbidity, or disability.[[8]](#endnote-8)

**Annual Routine Blood Tests:** Blood tests are part of most exams. Several organizations cite the utility of cholesterol screening, which we have discussed in another chapter. In one older study, the diagnostic value of a test was defined as its ability to detect a new clinical diagnosis, although the authors did not comment on whether such detection led to treatment, better outcomes, or harm. Overall there was diagnostic value of 28/1,000 chemistry panels ordered, 9/1,000 complete blood counts (CBC), and 7/1,000 thyroid tests. There were many false positives, with overall 360/1,000 tests demonstrating an abnormality, and 31/1,000 requiring further testing to prove that nothing was wrong.[[9]](#endnote-9)

A study looking only at CBC found that 5/1,000 led to a treatable diagnosis, and 25/1,000 required further testing to prove they were normal.[[10]](#endnote-10) The USPSTF suggests that there is no compelling evidence to recommend thyroid testing due to a high rate of false positives and a possible danger of over treating clinically insignificant abnormal thyroid tests. Overall they suggest that screening may identify 3/1,000 people with hypothyroidism over 5 years, but that treatment efficacy for such people has not been determined, so they may receive thyroid medicines unnecessarily.[[11]](#endnote-11)

**The Routine Urinalysis:** Many patients request an annual urinalysis, primarily as a means of detecting small amounts of blood that could portend bladder cancer. The American Cancer Society suggests that most studies do not demonstrate a higher rate of clinically significant bladder cancer detection with urinalysis, primarily because most people with even early treatable bladder cancer will have sufficient bleeding to be visually observed.[[12]](#endnote-12) The USPSTF also recommends against bladder cancer screening, citing a 900/1,000 false positive rate of a routine urinalysis. While there is no evidence that early detection of bladder cancer will improve outcome, there is a potential for harm from urinalysis, as many people with positive tests will be subjected to a cystoscopic evaluation, which itself carries a 25/1,000 risk of bleeding or perforation of the bladder.[[13]](#endnote-13)

**The Rectal Exam:** Often patients and doctors consider a finger probe of the rectum to be a painful necessity of the exam, especially in men. The goal of that exam is to detect rectal cancer and, in men, prostate cancer. There have been a few case control studies that suggest a tiny reduction in prostate cancer mortality among men who undergo regular screening, but those findings have been inconsistent, and the lack of abnormalities on a prostate exam does not imply the absence of cancer. In fact, in one study 250/1,000 of men who presented with metastatic prostate cancer had had normal rectal exams.[[14]](#endnote-14)[[15]](#endnote-15) An ongoing study in prostate screening that encompasses both rectal exam and PSA (which is covered elsewhere in the book) reported its seven year findings showing a prostate cancer mortality decrease of only 0.3/10,000 in the screened men.[[16]](#endnote-16)

The rectal exam also is plagued by a high rate of false positives and a low sensitivity, like many other screening tests. The false positive rate (abnormal exams in patients who, after further testing, had no disease) for prostate cancer is 720/1,000, and for rectal cancer it is 700/1,000. Also, as mentioned, rectal exams have a high false negative rate; 410/1,000 and 240/,1,000 prostate and rectal cancers, respectively, are missed in people with normal exams.[[17]](#endnote-17)[[18]](#endnote-18) Many men with false positive screens will be subjected to prostate biopsies or colonoscopies, which are not without risk. Others with false positive exams will be inappropriately labeled as having disease. Also, there is continuing controversy as to whether diagnosing prostate cancer by screening will reduce prostate cancer mortality as previously discussed, an important consideration especially given the significant morbidity of prostate cancer treatments.

**Aneurysm Screening:** Abdominal Aortic Aneurysms (AAA) are weak areas of the largest artery in our body that, if they become too large, can burst, causing a significant mortality rate. They typically present without symptoms, so many people suggest screening for AAA in the annual exam. The physical exam for AAA is done with a stethoscope on the abdomen in a search for bruits. Overall the diagnostic yield of the exam is poor; The false positive rate exceeds 500/1,000, and more than 500/1,000 of aneurysms cannot be detected on exam.[[19]](#endnote-19) The USPSTF recommends one time ultrasound screening for AAA in male smokers between the ages of 65-75 where the risk of having a clinically large aneurysm is approximately 50/1,000. However, there is no evidence that such screening has any impact on overall mortality, and it could lead to overtreatment with surgery, which itself has a mortality of 50/1,000 and a severe morbidity of 300/1,000. Screening is not recommended in other groups where the incidence of AAA is far lower.[[20]](#endnote-20)

**Carotid Artery Screening:** Very often doctors listen to the carotid arteries to find bruits that may be caused by a narrowing of the artery. Strokes can be caused by blocked carotid arteries, many of which are asymptomatic. Therefore it is felt that bruits may indicate serious carotid disease that, if found early, can be treated before instigating a stroke. Several studies have suggested that the incidence of bruits on exam increases the risk of stroke in that patient by 6/1,000 per year, although such a finding does not add any prognostic information to the patient’s overall risk factors for stroke. Also, the presence of a bruit does not predict where the patient may have a stroke; often the stroke occurs in the opposite side of the brain than where the bruit is found.[[21]](#endnote-21)

In fact, most bruits are false positives, with 750/1,000 of bruits not corresponding to carotid stenoses and thus not putting the patient at risk of having a stroke. Of all people with bruits, only 5/1,000 have significant carotid disease. Also the test has poor sensitivity, as approximately half of patients with significant carotid disease do not have bruits.[[22]](#endnote-22) Typically, if a bruit is heard, patients will be sent for carotid ultrasound or MRA, which in turn can lead to even more invasive testing since those procedures themselves have a high false positive rate (see chapter on carotid screening). Since 40/1,000 patients have bruits, carotid auscultation can lead to a significant amount of over-testing if performed as part of a general exam given its high false positive rate, as well as giving many people without bruits false assurance that they do not have significant stenosis given its high false negative rate. Both scenarios may lead to as much or more harm than benefit.

**EKG Screening:** We have discussed EKG tests to some extent in the stress test chapter. Several studies do suggest that an EKG can help predict adverse cardiac outcomes. One older study found that in men there was a 1/1000 increase risk of cardiac death per year with minor ekg abnormalities, and a 7/1,000 increase with major abnormalities. In women these numbers were 1/1,000 and 5/1,000 respectively.[[23]](#endnote-23) The USPSTF recommends against using resting or stress EKG screening in low risk patients and defers from making any judgment in higher risk patients due to a paucity of evidence that such tests improve cardiac outcome. There are not studies that suggest that any subsequent testing or intervention after an abnormal EKG will lead to benefit or harm.

The false positive and false negative rates of EKG testing are very high; normal tests do not accurately predict those who are safe from cardiac complications, while abnormal tests frequently occur in people at low risk for cardiac disease, something that may lead to unnecessary and possibly harmful additional testing.[[24]](#endnote-24) A study done in athletes showed that the false positive rate of abnormal EKG’s approximated 400/1,000.[[25]](#endnote-25) Also, in studies looking at the value of EKG’s used for preoperative evaluation, a common practice in health care today, the EKG failed to predict those patients who were vulnerable to a poor cardiac outcome beyond what the rest of the history prognosticated. Most striking in these studies was that 440/1,000 patients without cardiac problems had abnormal EKG’s, and that number was 750/1,000 in the elderly.[[26]](#endnote-26),[[27]](#endnote-27),[[28]](#endnote-28) Therefore, abnormalities on screening EKG’s are common, are poorly predictive of adverse outcome, may lead to interventions that are unnecessary and harmful, but do identify a small number of people at risk for cardiac death whose underlying history often also provides similar prognostic information.

**Skin Cancer Screening:** Often in their annual physicals patients receive a total skin exam, or are referred to a dermatologist to do the same. Every year 2-4 million Americans are diagnosed with non-melanoma skin cancers (squamous cell and basal cell), the vast majority of which are not fatal. Approximately, 75,000 are diagnosed with melanoma, with an annual mortality rate of 9,700. The USPSTF suggests that such exams are not clinically effective. While skin exams may discover melanomas earlier, there is no evidence that such early detection improves mortality or morbidity. Also the discovery of non-melanoma skin cancers is of moot value in many cases, in that they often have little potential for mortality or morbidity if left alone, especially in the elderly.

The National Cancer Institute cites one poorly performed study that compares a large cohort of patients in a skin screening program with a non-screened population, and finds a reduction in melanoma mortality of 1/100,000 over 10 years. The skin exam also has a very high false positive rate, finding moles and lesions that, after biopsy, were determined not to be cancer. In fact, 975/1,000 lesions felt to be melanoma by skin exam were proved to be benign moles after biopsy, 72/1,000 feared squamous cell cancer were benign, and 193/1,000 feared basal cell cancers were benign.[[29]](#endnote-29)[[30]](#endnote-30) Such a high false positive rate, coupled with the doubt about the efficacy of biopsying and removing non-melanoma cancers in many circumstances, leads to a large number of unnecessary biopsies and surgeries for lesions and cancers discovered by skin exam that are not dangerous. One study of the elderly suggests that 200/1,000 of people who underwent skin biopsies suffered significant complications, without deriving benefit.[[31]](#endnote-31) Like with many aspects of the annual exam, there seems to be a large chance of harm occurring from over-diagnosis, with little evidence of benefit with a skin exam.

1. <http://well.blogs.nytimes.com/2013/01/21/a-check-on-physicals/?_php=true&_type=blogs&_r=0> [↑](#endnote-ref-1)
2. <http://www.slate.com/articles/health_and_science/medical_examiner/2013/08/annual_checkups_going_to_the_doctor_when_you_re_not_sick_does_more_harm.html> [↑](#endnote-ref-2)
3. Boulware LE, et al. (2007) “Systematic Review: The Value of the Periodic Health Evaluation. Ann Intern Med. 2007;146:289–300 [↑](#endnote-ref-3)
4. Prochazka AV, et. al. (2005).” Support of Evidence-based Guidelines for the Annual Physical Examination: a Survey of Primary Care Providers,” Arch Intern Med. 2005;165:1347–52. [↑](#endnote-ref-4)
5. <http://www.slate.com/articles/health_and_science/medical_examiner/2013/08/annual_checkups_going_to_the_doctor_when_you_re_not_sick_does_more_harm.html> [↑](#endnote-ref-5)
6. <http://www.ncbi.nlm.nih.gov/books/NBK82767>Bloomfield, H, and Wilt, T. (2011)“Evidence Brief: Role of the Annual Comprehensive Physical Examination in the Asymptomatic Adult,” VA Evidence-based Synthesis Program Evaluation Briefs, October, 2011. [↑](#endnote-ref-6)
7. <http://www.acpinternist.org/archives/2010/01/annual.htm> [↑](#endnote-ref-7)
8. Krogsboll, L, et. al. (2012)“General Health Checks in Adults for Reducing Morbidity and Mortality from Disease,” BMJ, November 20, 2012, 345: 7191. [↑](#endnote-ref-8)
9. Boland, BJ, et. al. (1996)“Yield of Laboratory Tests for Case Finding in the Ambulatory General Exam,” American Journal of Medicine, August, 1996, 101(2): 141-52. [↑](#endnote-ref-9)
10. Ruttimann, S, et. al. (1992)“Usefulness of Complete Blood Count as a Case Finding Tool in Medical Outpatients,” Annals of Internal Medicine, January 1, 1992, 116(1): 44-50. [↑](#endnote-ref-10)
11. <http://www.uspreventiveservicestaskforce.org/3rduspstf/thyroid/thyrrs.htm> [↑](#endnote-ref-11)
12. <http://www.cancer.org/cancer/bladdercancer/detailedguide/bladder-cancer-detection> [↑](#endnote-ref-12)
13. <http://www.uspreventiveservicestaskforce.org/uspstf11/bladdercancer/bladcanes.pdf> [↑](#endnote-ref-13)
14. <http://www.cancer.gov/cancertopics/pdq/screening/prostate/HealthProfessional/page3#Reference3.14> [↑](#endnote-ref-14)
15. Otto, S, and Roobol, M. (2006)“Case Control Studies in Evaluating Prostate Cancer Screening: an Overview,” EAU, 2006, Series 4: 219-27. [↑](#endnote-ref-15)
16. Andriole, G, et. al. (2009) “Mortality Results from a Randomized Prostate Cancer Screening Trial,” NEJM, March 26, 2009, 360: 1310-19. [↑](#endnote-ref-16)
17. Ang, CW, et. al. (2008)“The Diagnostic Value of a Digital Rectal Exam in Primary Care for Palpable Rectal Tumors,” Colorectal Disease, October 2008, 10(8): 789-92. [↑](#endnote-ref-17)
18. Buntinx, F, et. al. (1994)“The Diagnostic Value of Digital Rectal Exam in Primary Care Screening for Prostate Cancer,” Family Practice, 1994, 16(6): 621-26. [↑](#endnote-ref-18)
19. Pysklywec, M, and Evans, M. (2009)“Diagnosing Abdominal Aortic Aneurysm: How Good is the Physical Exam?” Canadian Family Physician, September, 2009, 45: 2069-70 [↑](#endnote-ref-19)
20. <http://www.uspreventiveservicestaskforce.org/uspstf/uspsaneu.htm> [↑](#endnote-ref-20)
21. Aronson, L, and Landenfeld, C (1998)“Examining Older People for Carotid Bruits,” J Gen Intern Med, February, 1998, 13(2): 140-1. [↑](#endnote-ref-21)
22. Ratchford, EV, et. al. (2009), “Carotid Bruit for Detection of Hemodynamically Significant Carotid Stenosis: the Northern Manhattan Study,” Neurol Res, September 2009, 31(7): 748-52. [↑](#endnote-ref-22)
23. De Bacquer, D, et. al. (1998) “Prognostic Value of ECG Findings for Total, Cardiovascular, and Coronary Heart Disease Death in Men and Women,” Heart, 1998, 80: 570-77. [↑](#endnote-ref-23)
24. <http://www.uspreventiveservicestaskforce.org/uspstf11/coronarydis/chdupd.htm#results> [↑](#endnote-ref-24)
25. Pelliccia, A, et. al. (2000)“Clinical Significance of Abnormal ECG Patterns in trained Athletes,” Circulation, 2000, 102: 278-84. [↑](#endnote-ref-25)
26. Noordzij PG, et. al. (2006)“Prognostic Value of Routine Preoperative Electrocardiography in Patients Undergoing Noncardiac Surgery,” Am J Cardiol 2006; 97:1103–1106 [↑](#endnote-ref-26)
27. Liu LL, et. al. (2002) “Preoperative Electrocardiogram Abnormalities Do Not Predict Postoperative Cardiac Complications in Geriatric Surgical Patients,” J Am Geriatr Soc 2002; 50:1186–1191. [↑](#endnote-ref-27)
28. Van Klei WA, et. al. (2007)“The Value of Routine Preoperative Electrocardiography in Predicting Myocardial Infarction after Noncardiac Surgery,” Ann Surg 2007; 246:165–170 [↑](#endnote-ref-28)
29. <http://www.uspreventiveservicestaskforce.org/uspstf09/skincancer/skincanrs.htm> [↑](#endnote-ref-29)
30. <http://www.cancer.gov/cancertopics/pdq/screening/skin/HealthProfessional/page2> [↑](#endnote-ref-30)
31. [www.ucsf.edu/news/2013/04/105436/surgery-nonfatal-skin-cancers-might-not-be-best-elderly-patients](http://www.ucsf.edu/news/2013/04/105436/surgery-nonfatal-skin-cancers-might-not-be-best-elderly-patients) [↑](#endnote-ref-31)