
Family Practice Forum

Use and Abuse of the Baseline Laboratory Test in Periodic Health Screening

Paul S. Frame, MD
Cohocton, New York

With uncanny regularity during conferences and discussions on selective longitudinal screening of healthy people the question arises: "What about doing a given test once as a baseline?" The question is usually posed with regard to either chest x-ray films, electrocardiograms, or chemical screening profiles after agreement has been reached that these tests are not indicated as routine screening procedures according to criteria for rational selective longitudinal screening.¹ The

question frequently reveals a lack of clear understanding of the definition and use of a "baseline" laboratory test.

The word *baseline* is defined in Funk and Wagnalls' Standard Encyclopedia Dictionary as "a line, value, etc, taken as a base for measurement or comparison."² This definition means that the baseline test itself is not expected to yield a diagnosis or trigger a change in therapeutic management. Rather, at some future time under specified conditions the test will be repeated and comparison of the initial result with the later result will yield useful information *not obtainable by looking at either single result alone*.

The definition has two important components. First, the comparison with a later result and not the result of the baseline test itself is what is important. In most cases the baseline test will be normal. Unfortunately, in a few cases it will be abnormal and pose the dilemma of what to do with

Requests for reprints should be addressed to Dr. Paul S. Frame, Tri County Family Medicine, Box 4111, Cohocton, NY 14826.

an unexpected abnormal result. It has been suggested, only partly facetiously, that the best thing to do with a baseline test is to hide it without looking at it until such time as the comparison is made. The second component of the definition is the presence of an identified time period during which comparison of results is useful. This time period is variable depending on the test in question but is not completely open ended. After some period of time the baseline test will lose its value for comparison.

The electrocardiogram is an example of a test which is not useful as a baseline in the asymptomatic outpatient, but can be a useful baseline in the acutely symptomatic patient in the coronary care unit setting.³ This is because the time period during which comparison of results is useful is short, usually hours or days but at most several weeks.

Suppose a man, aged 40 years, who is asymptomatic, with or without risk factors for coronary heart disease, has a normal baseline cardiogram. If he presents ten years later or even two years later with chest pain, the result of the previous electrocardiogram is not useful (assuming it is available, which is frequently not the case). The decision to admit the patient for observation and monitoring will be made largely on clinical grounds aided perhaps by the acute cardiogram if it shows diagnostic changes. Comparison with the old cardiogram is not useful because any differences between the two could have occurred years ago as well as hours ago. Comparison loses its value because the useful time period of days or weeks has been exceeded.

But what if the original baseline electrocardiogram was abnormal? Suppose it showed a left bundle branch block. Would that not be useful to know if the patient presented two years later with chest pain and his acute cardiogram again showed a left bundle branch block? The answer, unfortunately, is no. The decision to admit or not to admit would still have to be made on clinical grounds. Numerous patients in the early stages of a myocardial infarction have normal or unchanged electrocardiograms. Furthermore, there would have been the problem of how to handle the original abnormal result in this asymptomatic patient. For legal as well as ethical reasons, the patient would have to be told the result. Presumably he has already been screened for risk factor reduction

such as not smoking and control of hypertension and cholesterol levels so the abnormal cardiogram would not lead to any new significant therapy. It probably would lead to considerable patient anxiety.

The chest x-ray film is not a useful baseline test in the asymptomatic patient for the same reasons the electrocardiogram is not; the interval during which comparison is useful is very short.

A baseline mammogram at age 35 to 45 years has been recommended by some authorities.⁴ However, the role of mammography itself as a routine screening procedure is still controversial.^{5,6} In addition, there are no data which show how often comparison of a baseline mammogram with a future screening mammogram is helpful in diagnosing early breast cancer.

A proper baseline test is done only for comparison with a future repeat test and there is a specified time interval during which this comparison is useful. In screening the asymptomatic patient there are no tests which can be justified solely as a baseline. The electrocardiogram, chest x-ray film, and mammogram have not been shown to be useful baseline examinations.

References

1. Frame PS, Carlson SJ: A critical review of periodic health screening using specific screening criteria: Parts 1-4. *J Fam Pract* 2:29, 123, 189, 283, 1975
2. Funk & Wagnalls Standard Encyclopedic Dictionary. Chicago, JG Ferguson, 1968
3. Rubenstein LZ, Greenfield S: The baseline ECG in the evaluation of acute cardiac complaints. *JAMA* 244:2536, 1980
4. ACS Report on the Cancer-Related Health Checkup. New York, American Cancer Society, 1980
5. Bailar JC: Screening for early breast cancer: Pros and cons. *Cancer* 39:2783, 1977
6. Mahoney LJ, Bird BL, Cooke GM: Annual clinical examination: The best available screening test for breast cancer. *N Engl J Med* 301:315, 1979